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Question 1 of 212

A 25-year-old woman presents to the general practitioner (GP) with tiredness, weight loss and diarrhoea. She has also been suffering from heavy periods over the past few months.

On examination she looks tanned, but is very thin and emaciated. Her blood pressure is 115/80, pulse is 84 and regular and she has a postural drop of 20 mmHg on standing.

Investigations:

Hb	9.1 g/dl (normocytic)
WCC	6.1×10^9/l
PLT	195×10^9/l
Na^+	132 mmol/l
K^+	5.8 mmol/l
Ferritin	25 µg/l
Folate	4.0 µg/l
Ca^+	2.35 mmol/l
Albumin	28 g/l
ALT	42 U/l
TSH	8.3 U/l
Glucose	8.5 mmol/l (fasting)

Which of the following is the most likely diagnosis?

A Coeliac disease

B Polyglandular syndrome type 1

Rana Alnasser's screen

regular and she has a postural drop of 20 mmHg on standing.

Investigations:

Hb	9.1 g/dl (normocytic)
WCC	6.1×10^9/l
PLT	195×10^9/l
Na^+	132 mmol/l
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Ca^+	2.35 mmol/l
Albumin	28 g/l
ALT	42 U/l
TSH	8.3 U/l
Glucose	8.5 mmol/l (fasting)

Which of the following is the most likely diagnosis?

A Coeliac disease

B Polyglandular syndrome type 1

C Polyglandular syndrome type 2

D Polyglandular syndrome type 3

E HIV infection

Explanation

C **Polyglandular syndrome type 2**

Type 2 polyglandular syndrome is characterised by adrenal insufficiency, hypothyroidism and type 1 diabetes; hypogonadism, coeliac disease and myasthenia gravis may also be seen. The hyponatraemia, elevated fasting glucose and elevated TSH all support this as the diagnosis.

A Coeliac disease

This may explain the diarrhoea, but it would not explain the hyponatraemia and hyperkalaemia seen here, nor the postural drop in blood pressure.

B Polyglandular syndrome type 1

This is characterised by mucocutaneous candidiasis, hypoparathyroidism and adrenal insufficiency.

D Polyglandular syndrome type 3

Type 3 polyglandular syndrome is characterised by autoimmune thyroiditis, but the other associated autoimmune diseases don't fit with a diagnosis of either type 1 or type 2 disease.

E HIV infection

Although HIV infection may present with significant weight loss and diarrhoea, the abnormalities seen on blood testing are much more consistent with autoimmune polyglandular syndrome.

A woman is 32 weeks' pregnant. She is taking propylthiouracil 150 mg daily for thyrotoxicosis.

On her check-up, she complains of heat intolerance and palpitations, and repeat thyroid function tests confirm that thyroid-stimulating hormone (TSH) is < 0.1, and T3 and T4 are also elevated.

Which of the following is the next most appropriate management step?

- A Increase propylthiouracil dose
- B Radioiodine treatment
- C Induce delivery
- D Stop propylthiouracil and start carbimazole
- E Arrange for partial thyroidectomy

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C	Induce delivery
D	Stop propylthiouracil and start carbimazole
E	Arrange for partial thyroidectomy

Explanation

D	Stop propylthiouracil and start carbimazole

In pregnancy, PTU is only recommended in guidelines for the first trimester of pregnancy. After this time, a switch to carbimazole is recommended because of the risk of maternal liver toxicity associated with PTU use. This patients should be switched to carbimazole and the PTU not up-titrated.

A	Increase propylthiouracil dose

Both carbimazole, at a suggested daily dose of 10–20 mg, and propylthiouracil (PTU), at a dose of 150 mg bd, are acceptable for use in pregnancy, although PTU tends to be the more popular choice. PTU may be more protein-bound and so less is transmitted to the foetus, but compliance with carbimazole is generally better. In addition, there is evidence that PTU may be associated with maternal hepatotoxicity in late pregnancy, precipitating a change to carbimazole as the most appropriate in that case.

B	Radioiodine treatment

Radioiodine treatment is contraindicated in pregnancy, since radioiodine crosses the placenta and can cause congenital hypothyroidism. Following radioactive iodine

Thyrotoxic crisis ('thyroid storm') requires emergency treatment with intravenous administration of fluids, propranolol hydrochloride and hydrocortisone (as sodium succinate), as well as oral iodine solution and carbimazole or propylthiouracil which may need to be administered by nasogastric tube.

Antithyroid drugs in pregnancy

Radioactive iodine therapy is contra-indicated during pregnancy. Propylthiouracil and carbimazole can be given but the blocking-replacement regimen is **not** suitable. Rarely, carbimazole has been associated with congenital defects, including aplasia cutis of the neonate, therefore propylthiouracil remains the drug of choice during the first trimester of pregnancy. In the second trimester, consider switching to carbimazole because of the potential risk of hepatotoxicity with propylthiouracil. Both propylthiouracil and carbimazole cross the placenta and in high doses may cause fetal goitre and hypothyroidism—the lowest dose that will control the hyperthyroid state should be used (requirements in Graves' disease tend to fall during pregnancy).

Advanced Pharmacy Services

Patients with thyroid disorders may be eligible for the Medicines Use Review service provided by a community pharmacist. For further information, see *Advanced Pharmacy Services* in Guidance on prescribing.

Related drugs

- CARBIMAZOLE
- HYDROCORTISONE
- LEVOTHYROXINE SODIUM
- NADOLOL
- PROPRANOLOL HYDROCHLORIDE
- PROPYLTHIOURACIL

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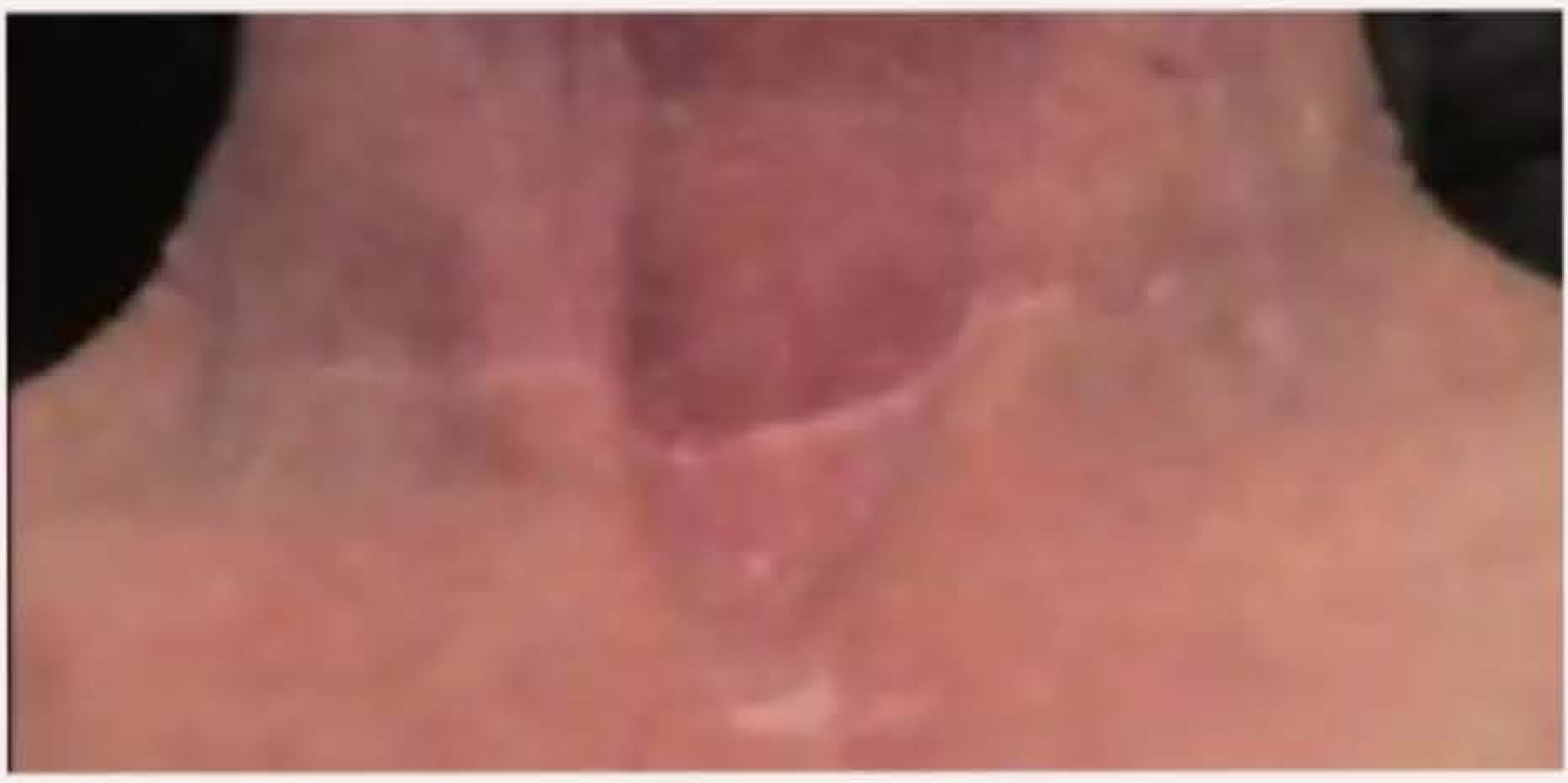
Question 3 of 212

A 59-year-old woman presents to the clinic with tiredness. She takes no medication, and her thyroid-stimulating hormone (TSH) level is in the normal range. She has had a pituitary adenoma in the past that was found to be prolactin-secreting, and she tells you she had some benign tumours removed from her neck. She takes calcium and vitamin D supplements.

A picture of her neck is shown below.



What is she most likely to be suffering from?

A	Familial medullary thyroid cancer
B	Hyperparathyroidism-jaw tumour syndrome
C	Multiple endocrine neoplasia type 1 (MEN-1)
D	Multiple endocrine neoplasia type 2a (MEN-2a)
E	Multiple endocrine neoplasia type 2b (MEN-2b)

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E Multiple endocrine neoplasia type 2b (MEN-2b)

Explanation

C Multiple endocrine neoplasia type 1 (MEN-1)

MEN-1 is associated with the development of parathyroid adenomas (linked to the neck scar and vitamin D and calcium supplementation seen here). The syndrome is also linked to pituitary adenomas, particularly prolactinomas, and endocrine pancreatic tumours. The history seen here is therefore consistent with MEN-1. Around 60% of islet cell tumours do not originate from beta cells, and these are more common in the over-40 population.

A Familial medullary thyroid cancer

Medullary thyroid cancer would not explain the presentation with prolactinoma and, as part of a syndrome, is associated with MEN-2. It is not associated with parathyroid adenomas.

B Hyperparathyroidism-jaw tumour syndrome

An autosomal dominant inheritance pattern for familial hyperparathyroidism does exist, although it would not explain the presentation with a prolactinoma seen here.

D Multiple endocrine neoplasia type 2a (MEN-2a)

MEN-2 is associated with primary hyperparathyroidism, but it is also associated with phaeochromocytoma and medullary thyroid cancer, rather than the pituitary tumour reported here.

E Multiple endocrine neoplasia type 2b (MEN-2b)

A | Familial medullary thyroid cancer

Medullary thyroid cancer would not explain the presentation with prolactinoma and, as part of a syndrome, is associated with MEN-2. It is not associated with parathyroid adenomas.

B | Hyperparathyroidism-jaw tumour syndrome

An autosomal dominant inheritance pattern for familial hyperparathyroidism does exist, although it would not explain the presentation with a prolactinoma seen here.

D | Multiple endocrine neoplasia type 2a (MEN-2a)

MEN-2 is associated with primary hyperparathyroidism, but it is also associated with phaeochromocytoma and medullary thyroid cancer, rather than the pituitary tumour reported here.

E | Multiple endocrine neoplasia type 2b (MEN-2b)

MEN-2b is associated with a marfanoid habitus, medullary thyroid cancer and phaeochromocytoma.

71650

An 18-year-old man with mild learning difficulties is referred to the Emergency Department for review. He has recently moved into sheltered accommodation in the area and is noted by staff to have made multiple complaints about muscular weakness and pins and needles affecting both hands. He has been noted by the GP to have hypocalcaemia and a raised level of parathyroid hormone.

On examination, there is obvious subcutaneous calcification and he has a short fifth metacarpal on each hand.

Which of the following is the treatment of choice for this patient?

A Parathyroidectomy

B Calcium supplementation

C Calcium and vitamin D supplementation

D Parathyroid hormone administration

E Calcitonin administration

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On examination, there is obvious subcutaneous calcification and he has a short fifth metacarpal on each hand.

Which of the following is the treatment of choice for this patient?

Your answer was correct

A	Parathyroidectomy
B	Calcium supplementation
C	Calcium and vitamin D supplementation
D	Parathyroid hormone administration
E	Calcitonin administration

Explanation

C Calcium and vitamin D supplementation

This individual has pseudohypoparathyroidism. It is associated with short stature, short metacarpals, subcutaneous calcification and variable intellectual impairment. The G-protein-coupled receptor for

C Calcium and vitamin D supplementation

This individual has pseudohypoparathyroidism. It is associated with short stature, short metacarpals, subcutaneous calcification and variable intellectual impairment. The G-protein-coupled receptor for parathyroid hormone (PTH) becomes unresponsive to the hormone, hence patients become hypocalcaemic in the face of normal or elevated PTH levels. Variable degrees of resistance involving other G-protein-mediated receptors, such as those linked to thyroid-stimulating hormone (TSH), luteinising hormone (LH) and follicle-stimulating hormone (FSH) activity, may also be seen. Calcium and vitamin D is the intervention of choice. Calcium levels should be monitored frequently during treatment as rapid rises may occur.

A Parathyroidectomy

The hypocalcaemia seen here is consistent with parathyroid resistance rather than functional parathyroid excess; hence parathyroidectomy is not appropriate.

B Calcium supplementation

Calcium supplementation alone is inadequate to restore normal calcium levels.

D Parathyroid hormone administration

Given this is a syndrome of parathyroid hormone resistance, supplementation of PTH will not restore normal calcium metabolism.

A 48-year-old man is referred to the clinic with newly diagnosed type 2 diabetes. He also complains of excessive sweating and worries that his hands have swollen so that his wedding ring no longer fits him.

Past medical history includes hypertension, which is managed with amlodipine and indapamide.

On examination, his blood pressure is 150/90 mmHg and he has a very prominent lower jaw. There is also soft tissue swelling of his hands.

Investigations:

Hb	14.9 g/dl
WCC	5.0 × 10^9/l
PLT	300 × 10^9/l
Na^+	138 mmol/l
K^+	4.0 mmol/l
Creatinine	100 µmol/l
Random glucose	12.1 mmol/l

Which one of the following would be the most appropriate initial investigation towards confirming this man's likely underlying diagnosis?

A Fasting plasma glucose

B Random growth hormone measurement

C Prolactin measurement

D Random cortisol measurement

E IGF-1 measurement

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On examination, his blood pressure is 150/90 mmHg and he has a very prominent lower jaw. There is also soft tissue swelling of his hands.

Investigations:

Hb	14.9 g/dl
WCC	5.0×10^9/l
PLT	300×10^9/l
Na^+	138 mmol/l
K^+	4.0 mmol/l
Creatinine	100 μmol/l
Random glucose	12.1 mmol/l

Which one of the following would be the most appropriate initial investigation towards confirming this man's likely underlying diagnosis?

A	Fasting plasma glucose
B	Random growth hormone measurement
C	Prolactin measurement
D	Random cortisol measurement
E	IGF-1 measurement

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E IGF-1 measurement

Explanation

E IGF-1 measurement

This patient has a clinical picture consistent with a diagnosis of acromegaly. IGF-1 measurement varies with age and nutritional status, but reference ranges exist for comparison. IGF-1 has a long half-life and, as such, is a useful measure of growth hormone status. Failure of growth hormone to suppress in response to an oral glucose challenge is the other diagnostic method of choice for assessing patients with possible acromegaly, although this is less convenient following an initial clinic appointment.

A Fasting plasma glucose

Although an elevation in fasting plasma glucose may indicate a diagnosis of diabetes, it won't reveal the underlying cause.

B Random growth hormone measurement

Growth hormone is released in pulsatile fashion and has a short half-life; as such, random measurement is not useful in confirming a diagnosis of acromegaly.

C Prolactin measurement

Prolactin may be elevated because of local pressure effects from a pituitary adenoma, but it won't confirm elevated growth hormone.

D Random cortisol measurement

An 18-year-old man presents to the clinic with bilateral gynaecomastia. He apparently had surgery as a child to correct bilateral undescended testes. On examination he is tall, with increased arm and leg length. He does have evidence of bilateral gynaecomastia, with small testes bilaterally. Apparently there have been problems with anxiety and bullying at 6th form and he has now left to begin a job.

Which of the following would be the most appropriate investigation?

A	Oestrogen
B	GNRH
C	FSH, LH
D	Progesterone
E	Testosterone

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An 18-year-old man presents to the clinic with bilateral gynaecomastia. He apparently had surgery as a child to correct bilateral undescended testes. On examination he is tall, with increased arm and leg length. He does have evidence of bilateral gynaecomastia, with small testes bilaterally. Apparently there have been problems with anxiety and bullying at 6th form and he has now left to begin a job.

Which of the following would be the most appropriate investigation?

Your answer was incorrect

A	Oestrogen
B	GNRH
C	FSH, LH
D	Progesterone
E	Testosterone

Explanation

C	FSH, LH

The suspicion here, based on history and physical appearance, is a diagnosis of Klinefelter syndrome. Both FSH and LH are raised in Klinefelter syndrome, and elevation would be a strong pointer to confirming the underlying diagnosis. Chromosomal analysis would be an

Explanation

C	FSH, LH

The suspicion here, based on history and physical appearance, is a diagnosis of Klinefelter syndrome. Both FSH and LH are raised in Klinefelter syndrome, and elevation would be a strong pointer to confirming the underlying diagnosis. Chromosomal analysis would be an obvious further step. Management centres on androgen replacement, cosmetic procedures and access to psychosexual counselling.

E	Testosterone

Although testosterone is reduced in patients with Klinefelter syndrome, measuring this wouldn't indicate whether the defect was at the level of the pituitary or the testes and hence FSH and LH measurement is more useful.

A	Oestrogen

Although oestrogen levels are elevated in patients with Klinefelter, they are less useful vs raised gonadotrophins in confirming the diagnosis.

B	GNRH

GNRH levels are reduced in Kallmann syndrome; this syndrome is associated with absence of sense of smell, which isn't reported as part of the scenario here.

D	Progesterone

Progesterone levels are not useful in the evaluation of Klinefelter syndrome.

You review a 28-year-old woman with Hashimoto's thyroiditis in the thyroid clinic. She has been stable on 100 µg of thyroxine for the past few years and recent TSH was measured at 1.0 mU/l some 6 months ago (normal range 0.4-5). The reason for this appointment is that she is 12 weeks pregnant.

How would you manage her thyroxine therapy during this pregnancy?

A	Increase her thyroxine dose by an average of 100 mcg
B	Increase her thyroxine dose by an average of 25-50 mcg
C	Reduce her thyroxine dose by an average of 25 mcg
D	Reduce her thyroxine dose by an average of 50 mcg
E	Keep her thyroxine dose unchanged

mcg

E | Keep her thyroxine dose unchanged

Explanation

B | Increase her thyroxine dose by an average of 25-50 mcg

In patients already on thyroxine when they become pregnant, thyroid function tests should be assessed at 6-8 weeks' gestation and then at 16-20 and 28-32 weeks. Average increase in thyroxine requirements is 25-50 µg, and the increased need for thyroxine ceases immediately after delivery. In patients with positive thyroid autoantibodies there is a twofold increased risk of spontaneous abortion. In patients who are suboptimally treated for hypothyroidism there is a 21% risk of pregnancy-induced hypertension. Maternal hypothyroidism is also associated with increased risk of pregnancy-induced anaemia and postpartum haemorrhage; for these reasons it is crucial that patients with hypothyroidism are followed up appropriately during pregnancy. TSH should be monitored, and guidelines suggest aiming to keep TSH below 3.0.

E | Keep her thyroxine dose unchanged

The 30% increase in thyroid hormone requirements in pregnancy will mean this patient slips into hypothyroidism as her pregnancy progresses.

A | Increase her thyroxine dose by an average of 100 mcg

This runs the risk of symptomatic hyperthyroidism in pregnancy, increasing the risk of spontaneous abortion.

after delivery. In patients with positive thyroid autoantibodies there is a twofold increased risk of spontaneous abortion. In patients who are suboptimally treated for hypothyroidism there is a 21% risk of pregnancy-induced hypertension. Maternal hypothyroidism is also associated with increased risk of pregnancy-induced anaemia and postpartum haemorrhage; for these reasons it is crucial that patients with hypothyroidism are followed up appropriately during pregnancy. TSH should be monitored, and guidelines suggest aiming to keep TSH below 3.0.

E Keep her thyroxine dose unchanged

The 30% increase in thyroid hormone requirements in pregnancy will mean this patient slips into hypothyroidism as her pregnancy progresses.

A Increase her thyroxine dose by an average of 100 mcg

This runs the risk of symptomatic hyperthyroidism in pregnancy, increasing the risk of spontaneous abortion.

C Reduce her thyroxine dose by an average of 25 mcg

Thyroid hormone requirements increase by an average of 30% in pregnancy; as such, this is not the appropriate course of action.

D Reduce her thyroxine dose by an average of 50 mcg

Even if this patient wasn't pregnant, halving her thyroxine dose risks symptomatic hypothyroidism.

A 25-year-old man attends the clinic with his partner as they have difficulties with fertility, having tried for a baby for over 24 months with no success. He admits to decreased libido and some problems maintaining his erection. He has also had difficulties with his sense of smell for as long as he can remember. On examination his BP is 120/70 mmHg, with a pulse of 75/min. He has a small penis and sparse secondary sexual hair.

Investigations:

Hb	12.4 g/dl
WCC	7.1 x 10^9/l
PLT	203 x 10^9/l
Na^+	139 mmol/l
K^+	4.4 mmol/l
Creatinine	110 µmol/l
TSH	1.2 U/l (0.5-4.5 U/l)
Free T_4	12 pmol/l (10-22)
Testosterone	7.0 nmol/l (9-35)
FSH	0.4 U/l (1-7)
LH	2 U/l (1-10)

Which of the following is the most likely diagnosis?

A	Kallmann syndrome
B	Kleinfelter syndrome
C	Mumps orchitis

Creatinine	110 μmol/l
TSH	1.2 U/l (0.5-4.5 U/l)
Free T_4	12 pmol/l (10-22)
Testosterone	7.0 nmol/l (9-35)
FSH	0.4 U/l (1-7)
LH	2 U/l (1-10)

Which of the following is the most likely diagnosis?

A Kallmann syndrome
B Kleinfelter syndrome
C Mumps orchitis
D Pituitary failure
E Androgen insensitivity syndrome

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A 40-year-old man attends the GP surgery for review. He reports pain in his calves while walking his dog after only quite modest exercise. He is a current smoker with a 60-pack-year history. He has a family history of early cardiovascular disease. On examination he has tendon xanthomas affecting the extensor tendons of his fingers and at the elbows. You notice that he appears to have corneal arcus.

Which of the following represents the most likely diagnosis in this case?

A	Heterozygous familial hypercholesterolaemia
B	Homozygous familial hypercholesterolaemia
C	Familial hypertriglyceridaemia
D	Apo CII deficiency
E	Tangier disease

A 40-year-old man attends the GP surgery for review. He reports pain in his calves while walking his dog after only quite modest exercise. He is a current smoker with a 60-pack-year history. He has a family history of early cardiovascular disease. On examination he has tendon xanthomas affecting the extensor tendons of his fingers and at the elbows. You notice that he appears to have corneal arcus.

Which of the following represents the most likely diagnosis in this case?

Your answer was correct

A Heterozygous familial hypercholesterolaemia
B Homozygous familial hypercholesterolaemia
C Familial hypertriglyceridaemia
D Apo CII deficiency
E Tangier disease

Explanation

A Heterozygous familial hypercholesterolaemia

Heterozygous familial hypercholesterolaemia is an autosomal dominant condition that affects around 1 in 500 people. Although the diagnosis is mainly biochemical, two physical signs may be present, in corneal arcus and tendon xanthomata. The Simon Broome criteria are used to

Explanation

A Heterozygous familial hypercholesterolaemia

Heterozygous familial hypercholesterolaemia is an autosomal dominant condition that affects around 1 in 500 people. Although the diagnosis is mainly biochemical, two physical signs may be present, in corneal arcus and tendon xanthomata. The Simon Broome criteria are used to diagnose familial hypercholesterolaemia:

- Total cholesterol level >7.5 mmol/l and LDL >4.9 mmol/l; plus
- Tendon xanthomata or evidence of these in a 1st or 2nd degree relative; or
- DNA evidence of an LDL receptor mutation, familial defective apo-B-100 or a PCSK9 mutation.

Heterozygotes rarely present before the age of 30. In this case the patient has presented with intermittent claudication. Treatment is with aggressive lipid-lowering therapies, such as high-dose statins ± the addition of ezetimibe.

B Homozygous familial hypercholesterolaemia

Homozygotes present with very early cardiovascular disease, sometimes as early as the 2nd decade of life.

C Familial hypertriglyceridaemia

Patients with hypertriglyceridaemia are often asymptomatic. They may present with abdominal pain due to pancreatitis, lipaemia retinalis or eruptive xanthomas over extensor surfaces or buttocks.

Homozygotes present with very early cardiovascular disease, sometimes as early as the 2nd decade of life.

C	Familial hypertriglyceridaemia

Patients with hypertriglyceridaemia are often asymptomatic. They may present with abdominal pain due to pancreatitis, lipaemia retinalis or eruptive xanthomas over extensor surfaces or buttocks.

D	Apo CII deficiency

This condition causes an accumulation of chylomicrons. It tends to present with hepatosplenomegaly, abdominal pain and eruptive xanthomas.

E	Tangier disease

Tangier disease is also known as familial alpha-lipoprotein deficiency. Cholesterol deposition is common in the tonsils, lymph nodes, bone marrow, liver and spleen.

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A 33-year-old female auxiliary nurse presents for review. She has had difficulty with managing her hypertension and is currently taking atenolol 100 mg, amlodipine 10 mg and ramipril 10 mg, yet her blood pressure is still raised at 165/80 mmHg. She takes beclomethasone 100 mcg BD for asthma, but nil else of note.

On examination, she has a body mass index (BMI) of 29, with no obvious abdominal striae.

Fasting blood results:

Na^+	140 mmol/l
K^+	2.8 mmol/l
Creatinine	90 μmol/l
HCO_3^-	40 mmol/l
Glucose	5.0 mmol/l

What diagnosis fits best with this clinical picture?

A Fibromuscular hyperplasia

B Diabetic nephropathy

C Conn syndrome

D Cushing syndrome

E Essential hypertension

Rana Alnasser's screen

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Creatinine	90 µmol/l
HCO_3^-	40 mmol/l
Glucose	5.0 mmol/l

What diagnosis fits best with this clinical picture?

Your answer was correct

A	Fibromuscular hyperplasia
B	Diabetic nephropathy
C	Conn syndrome
D	Cushing syndrome
E	Essential hypertension

Explanation

Explanation

C **Conn syndrome**

Adrenal adenomas account for around 60% of cases of hyperaldosteronism, the likely cause of the profound hypokalaemia and resistant hypertension seen here. Small aldosterone-producing adrenal adenomas are commoner in young women, whereas bilateral adrenal hyperplasia tends to occur later and is commoner in men.

The best test for Conn syndrome is to look at renin/aldosterone levels, with antihypertensive medication having been discontinued for around 3 weeks if possible. This is because the pre-existing antihypertensive medications can impact upon the renin:aldosterone ratio. Clearly the diagnosis would be supported if aldosterone levels were raised in the presence of depressed renin levels.

A **Fibromuscular hyperplasia**

Fibromuscular hyperplasia is a cause of hypereninaemic hyperaldosteronism. Although it does cause hypertension, the marked reduction in potassium despite angiotensin-converting enzyme (ACE) inhibition as seen here would not be expected, and a rise in creatinine associated with ACE inhibition would be likely.

B **Diabetic nephropathy**

This patient fits the criteria for diabetes mellitus, although this is most likely early and is a chance finding here and not the cause of her hypertension. Renal dysfunction in type 2 diabetes is more commonly seen in older individuals and is a product of both sustained hypertension and diabetic nephropathy itself.

be expected, and a rise in creatinine associated with ACE inhibition would be likely.

B Diabetic nephropathy

This patient fits the criteria for diabetes mellitus, although this is most likely early and is a chance finding here and not the cause of her hypertension. Renal dysfunction in type 2 diabetes is more commonly seen in older individuals and is a product of both sustained hypertension and diabetic nephropathy itself.

D Cushing syndrome

Her BMI of 29 and the lack of obvious serious truncal obesity both count against Cushing as the underlying diagnosis here.

E Essential hypertension

The marked hypokalaemia and metabolic alkalosis on blood picture do not fit with a diagnosis of essential hypertension.

A 60-year-old woman on long-term therapy for depression has been referred by the Psychiatric Services. She presented acutely via the community psychiatric nurse with increasing drowsiness and confusion.

According to her carer, she had complained of increasing thirst and going to the bathroom over the past few days, and appeared to have been drinking more fluids over the past few weeks.

Investigations:

Na^+	156 mmol/l
Urea	20 mmol/l
Creatinine	205 μmol/l
Cl^-	112 mmol/l
Glucose	6.1 mmol/l
Ca^{++}	2.6 mmol/l

Which of the following medications is likely to be responsible for this lady's presentation?

A	Paroxetine
B	Fluoxetine
C	Lithium
D	Amitriptyline
E	Chlorpromazine

Urea	20 mmol/l
Creatinine	205 µmol/l
Cl^-	112 mmol/l
Glucose	6.1 mmol/l
Ca^{++}	2.6 mmol/l

Which of the following medications is likely to be responsible for this lady's presentation?

Your answer was correct

A Paroxetine
B Fluoxetine
C Lithium
D Amitriptyline
E Chlorpromazine

Explanation

C Lithium

This lady's long history of depression is likely to be related to bipolar disorder, which has resulted in a long-term script for lithium and her presentation with nephrogenic diabetes insipidus (DI), as shown by her hypernatraemia and picture of dehydration on blood testing. Causes of nephrogenic diabetes insipidus include an X-linked inherited disorder, an autosomal recessive pattern of inheritance, lithium, demeclocycline, chronic renal disease, post-obstructive

Explanation

C Lithium

This lady's long history of depression is likely to be related to bipolar disorder, which has resulted in a long-term script for lithium and her presentation with nephrogenic diabetes insipidus (DI), as shown by her hypernatraemia and picture of dehydration on blood testing. Causes of nephrogenic diabetes insipidus include an X-linked inherited disorder, an autosomal recessive pattern of inheritance, lithium, demeclocycline, chronic renal disease, post-obstructive uropathy, hypercalcaemia and hyperglycaemia. Therapy should only be stopped with the advice of her psychiatrist, although her symptoms are highly unlikely to improve unless the lithium therapy is ceased. Bendroflumethiazide and indomethacin may be useful in nephrogenic DI due to their local action on the kidney in cases that fail to respond to cessation of lithium: because both increase lithium levels they can't be given at the same time. Desmopressin (DDAVP) is a treatment for cranial diabetes insipidus and so is of little value here.

A Paroxetine

Paroxetine is a selective serotonin uptake inhibitor (SSRI), which is rarely associated with the serotonin syndrome but is not associated with nephrogenic diabetes insipidus.

B Fluoxetine

Like paroxetine, fluoxetine is an SSRI and is not associated with nephrogenic diabetes insipidus.

D Amitriptyline

Amitriptyline is a tricyclic antidepressant which may be associated with syndrome of inappropriate anti-diuretic

A 25-year-old patient presents with palpitations, anxiety and heat intolerance. She has a small, smooth goitre on palpation of her neck. BP is 122/72, with pulse is 88 and regular. There is a fine tremor at rest and she has sweaty palms. Urea and electrolytes are unremarkable, TSH is <0.01, and T4 and T3 are both elevated. Thyroid scanning reveals a uniformly increased uptake of technetium.

What diagnosis fits best with this clinical picture?

A Grave's disease
B Subacute thyroiditis
C Toxic adenoma
D Toxic multi-nodular goitre
E Hashimoto's thyroiditis

palpation of her neck. BP is 122/72, with pulse is 88 and regular. There is a fine tremor at rest and she has sweaty palms. Urea and electrolytes are unremarkable, TSH is <0.01, and T4 and T3 are both elevated. Thyroid scanning reveals a uniformly increased uptake of technetium.

What diagnosis fits best with this clinical picture?

Your answer was correct

A Grave's disease

B Subacute thyroiditis

C Toxic adenoma

D Toxic multi-nodular goitre

E Hashimoto's thyroiditis

Explanation

A Grave's disease

Thyrotoxicosis has a female:male ratio of 10 : 1 in the UK and affects 2% of the female population. Graves' disease is the commonest cause of thyrotoxicosis. It is associated with uniformly increased uptake on thyroid scanning. Treatment involves a period of block-replace therapy with carbimazole and thyroxine; this is followed in some patients by remission. In others the condition recurs and radioiodine therapy is the treatment of choice.

B Subacute thyroiditis

E Hashimoto's thyroiditis

Explanation

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B Subacute thyroiditis

Subacute thyroiditis is associated with symptoms of hyperthyroidism, although other symptoms include a tender goitre and a short, flu-like illness, neither of which are reported here. Anti-thyroid drugs are not used in therapy; non-steroidals or a short course of prednisolone may be required.

C Toxic adenoma

The fact that there is a small, smooth goitre and uniform technetium uptake rules out a toxic adenoma.

D Toxic multi-nodular goitre

Toxic multinodular goitre is associated with a non-smooth goitre, thyrotoxicosis and patchy increased uptake on the technetium scan.

E Hashimoto's thyroiditis

An elderly man has routine blood tests taken before a hernia repair. Liver function tests are repeated twice, with calcium, alanine aminotransferase (ALT) and bilirubin in the normal range, but alkaline phosphatase is raised at 380. On further questioning he admits to drinking a glass of beer and smoking 5 cigarettes per day, and also to pain in his hips and lower back. He has recently been assessed for hearing loss.

Which of the following tests represents the best investigation to further confirm the diagnosis?

A	Isotope bone scan
B	Skeletal survey
C	Immunoglobulin electrophoresis
D	Ultrasound scan (USS) liver
E	Chest X-Ray

Question 13 of 212

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Explanation

B Skeletal survey

The history and blood results here are suggestive of a diagnosis of Paget's disease. Recent evidence has suggested that limited skeletal survey is superior to bone scan for the assessment of the disease because, when

Explanation

B Skeletal survey

The history and blood results here are suggestive of a diagnosis of Paget's disease. Recent evidence has suggested that limited skeletal survey is superior to bone scan for the assessment of the disease because, when there is significant osteoclastic resorption of bone, bone scanning underestimates the extent of disease activity and still requires plain radiography for confirmation. Paget's is present in around 2% of the population over 55 years, this prevalence increasing with age, and the disease is also more common in men (sex ratio 3:2 men:women). Deafness may be a feature in up to half of all patients with skull base Paget's. Osteogenic sarcoma is a very rare complication of the disease. The mainstay of treatment is with bisphosphosphonates.

A Isotope bone scan

Bone scanning underestimates osteoclastic disease activity in Paget's disease, meaning that limited skeletal survey is the better option.

C Immunoglobulin electrophoresis

Immunoglobulin electrophoresis is most useful in the evaluation of multiple myeloma. The lack of other abnormal blood tests apart from alkaline phosphatase, and the recent assessment for hearing loss, are stronger pointers towards a diagnosis of Paget's disease.

D Ultrasound scan (USS) liver

rmal liver function tests, the

Question 13 of 212

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D	Ultrasound scan (USS) liver

In the absence of other abnormal liver function tests, the elevation in alkaline phosphatase is much more likely to be related to bone turnover.

E	Chest X-Ray

Although this patient has a smoking history, the lack of significant respiratory symptoms makes bronchial carcinoma less likely as an underlying diagnosis.

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A 23-year-old man presents to the clinic complaining of a lump at the base of his neck. He has noticed that this has become particularly prominent with swallowing and has grown significantly over the past 8 weeks. There is also a problem with diarrhoea over the past few months.

Clinical examination reveals a thyroid nodule. On further questioning, it transpires that his mother died during a thyroidectomy some years ago.

Investigations:

Hb	12.1 g/dl
WCC	5.4 × 10^9/l
PLT	203 × 10^9/l
Na^+	140 mmol/l
K^+	5.2 mmol/l
Creatinine	110 µmol/l
Ca^{++}	2.85 mmol/l
Ret oncogene	positive

Which of the following is the most likely diagnosis?

A Medullary thyroid carcinoma

B Papillary thyroid carcinoma

C Follicular thyroid carcinoma

D Anaplastic thyroid carcinoma

E Thyroid adenoma

E Thyroid adenoma

Explanation

A Medullary thyroid carcinoma

Ret oncogene positivity raises the possibility of multiple endocrine neoplasia type 2 (MEN-2). Occasionally patients suffer troublesome diarrhoea in response to increased calcitonin levels that cause increased gastrointestinal secretions. We are not given the calcitonin levels here, but it is to be assumed that they are likely to be raised. The thyroid nodule is most likely to be a medullary thyroid carcinoma. Given that his mother died on the operating table, the possibility of MEN-2 with co-existent phaeochromocytoma is further raised. The most appropriate initial screening test would be 24 h urine for catecholamines. MRI with or without meta-iodobenzylguanidine (MIBG) scanning is useful at a later stage for localising the site of a potential tumour. It is crucial to rule out a phaeochromocytoma, or to manage it appropriately with maximal alpha blockade, before progressing to thyroid surgery.

B Papillary thyroid carcinoma

Papillary thyroid carcinoma may be associated with RET mutations, but is also associated with mutations in RAS, BRAF and NTRK. The hypercalcaemia here is also more suggestive of MEN-2 because of co-associated hyperparathyroidism.

C Follicular thyroid carcinoma

Only a very small proportion of cases of follicular thyroid cancer (<5%) are thought to be related to a familial cancer

suggestive of MEN-2 because of co-associated hyperparathyroidism.

C	Follicular thyroid carcinoma

Only a very small proportion of cases of follicular thyroid cancer (<5%) are thought to be related to a familial cancer syndrome. Associated syndromes include (PTEN)-hamartoma tumour syndrome/Cowden syndrome, familial adenomatous polyposis/Gardner syndrome, Carney complex type 1, Werner syndrome and Pendred syndrome.

D	Anaplastic thyroid carcinoma

This is undifferentiated, fast growing and occurs most commonly in an elderly population.

E	Thyroid adenoma

Thyroid adenomas are not rapidly growing and would not fit with the picture seen here of a potentially cancerous lesion.

You are asked to see a 24-year-old woman who is 8 weeks into her first pregnancy. She has suffered vomiting and is finding it difficult to maintain weight.

On examination, she is clearly anxious. Her BP is 105/70, with pulse 75 and regular. Her BMI is 22.

Investigations:

Hb	119 g/dl
WCC	5.7 × 10^9/l
PLT	212 × 10^9/l
Na$^+$	144 mmol/l
K$^+$	3.4 mmol/l
Creatinine	100 µmol/l
Glucose	4.8 mmol/l
Total T4	185 nmol/l (58–174)
TSH	0.6 mU/l (0.4–5)

Which of the following is the most appropriate management in this case?

A Start propylthiouracil

B Start carbimazole

C Start propylthiouracil and thyroxine (block-replace)

D Start thyroxine therapy

E Observe

E	Observe

Explanation

E	Observe

This patient has increased total T4 with a TSH which is in the normal range. There are no clinical signs of hyperthyroidism. The weight loss and vomiting are most likely to be related to hyperemesis gravidarum. Although normal in this case, TSH itself may be suppressed in 13.5% of patients in the first trimester due to the thyrotrophic effects of beta HCG. There is a twofold increase in thyroid-binding globulin levels in pregnancy due to a combination of reduced hepatic clearance of thyroid-binding globulin and increased synthesis in response to oestrogen. The increased level of thyroid-binding globulin plateaus at 20 weeks and then gradually falls. In this case thyroid binding globulin may be useful in confirming the diagnosis.

A	Start propylthiouracil

Although thyrotoxicosis may occur in early pregnancy, the lack of symptoms of thyrotoxicosis here makes that much less likely as the underlying diagnosis, as does the fact that TSH is at the lower end of the normal range rather than being completely suppressed. Propylthiouracil is the treatment of choice for thyrotoxicosis in early pregnancy.

B	Start carbimazole

Carbimazole is the preferred intervention for thyrotoxicosis in late pregnancy because of the risk of maternal hepatotoxicity associated with propylthiouracil use.

C	Start propylthiouracil and thyroxine (block-

A 36-year-old man presents complaining of loss of libido and impotence. He finds work and entertaining clients very stressful.

Results of blood tests from GP were prolactin 3200 mU/l (< 360), normal thyroid function tests, MCV 100 fl, testosterone low. He admits on further questioning to drinking three glasses of wine per night. There is no reported visual field disturbance.

Which of the following is the most likely cause of his impotence?

A	Craniopharyngioma
B	Microprolactinoma
C	Alcohol abuse
D	Macroprolactinoma
E	Compression of pituitary stalk

Question 16 of 212

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B	Microprolactinoma
C	Alcohol abuse
D	Macroprolactinoma
E	Compression of pituitary stalk

Explanation

B Microprolactinoma

This patient's prolactin results are above 3000 mU/l, which is suggestive of a prolactinoma. The diagnostic test of choice would be MRI pituitary; microprolactinomas appear

E Compression of pituitary stalk

Explanation

B Microprolactinoma

This patient's prolactin results are above 3000 mU/l, which is suggestive of a prolactinoma. The diagnostic test of choice would be MRI pituitary; microprolactinomas appear as hypo-intense lesions within the pituitary on T1-weighted scanning. Given the fact that there are no signs of optic chiasm compression, and this patient's thyroid function tests are normal, it would be reasonable to give him a trial of dopamine agonist therapy. Surgery would be kept in reserve for this man if he was resistant or intolerant to drug therapy.

A Craniopharyngioma

Craniopharyngiomas are less likely to present with hyperprolactinaemia and more likely to present with diabetes insipidus, adrenal failure or pituitary-dependent hypothyroidism. Other focal neurological deficits as a result of local compression are also more likely to be seen.

C Alcohol abuse

Although there is evidence of alcohol abuse, including the raised MCV, this is unlikely to be the main cause of his problems.

D Macroprolactinoma

Levels of prolactin are usually above 6000 mU/l in macroprolactinoma.

E Compression of pituitary stalk

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D	Macroprolactinoma

Levels of prolactin are usually above 6000 mU/l in macroprolactinoma.

E	Compression of pituitary stalk

Elevation in prolactin due to compression is smaller than that seen here.

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A 42-year-old woman is referred with difficult-to-treat hypertension. She is currently taking ramipril 10 mg daily and bendrofluazide 2.5 mg daily, yet recent blood pressure was 165/90 mmHg.

Past medical history in the family of subarachnoid haemorrhage was noted. She is currently being treated with amitriptyline for depression. Circulating calcitonin levels are elevated.

Examination in the clinic reveals a patient of normal body habitus, with a blood pressure of 170/90 mmHg. Abdominal ultrasound is suspicious of a left adrenal mass.

Which of the following is the most appropriate treatment for her blood pressure prior to surgery?

A	Doxazosin
B	Prazosin
C	Atenolol
D	Phenoxybenzamine
E	Propranolol

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Your answer was correct

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C Atenolol

D Phenoxybenzamine

E Propranolol

Explanation

D Phenoxybenzamine

This patient has difficult hypertension, a left adrenal mass

E Propranolol

Explanation

D Phenoxybenzamine

This patient has difficult hypertension, a left adrenal mass and raised calcitonin levels. The suspicion is that she has MEN-2a. Given the adrenal mass and hypertension, 24 h urinary catecholamines should be assessed to rule out phaeochromocytoma. Amitriptyline can interfere with catecholamine measurements and should be discontinued for 4 days prior to the measurements. Phenoxybenzamine is the most potent available alpha blocker, is non-selective and irreversible, and it is therefore the treatment of choice for phaeochromocytoma. Starting dose is 10 mg bd, which should be increased up to a maximum of 20 mg qds. Intravenous phenoxybenzamine is commonly used for the days prior to surgery to ensure complete alpha blockade.

A Doxazosin

Conventional alpha blockers are insufficient to gain complete blood pressure control in phaeochromocytoma; as such, their use is not recommended here.

B Prazosin

Similar to doxazosin, prazosin is ineffective with respect to achieving adequate alpha blockade in phaeochromocytoma.

C Atenolol

When beta blockers are used in the absence of complete alpha blockade, a paradoxical rise in blood pressure can be seen in phaeochromocytoma; as such, they are only used

A 23-year-old woman who is 10 weeks' pregnant is referred to the clinic by her GP. She is suffering from a great deal of tiredness and morning sickness. The GP is concerned about her thyroid function. She has lost 2 kg in weight over the past month. Her blood pressure is 115/82, with pulse 65 and regular.

Investigations:

TSH	0.2 U/l
Free T4	27 pmol/l (normal 10-22)

Which of the following is the most appropriate management for this patient?

A	Ask GP to repeat thyroid function tests in 2 months
B	Start propylthiouracil
C	Start carbimazole
D	Refer for partial thyroidectomy
E	Consider radioiodine

A Ask GP to repeat thyroid function tests in 2 months

Suppressed TSH with a small rise in free T4 is a normal finding in 13.5% of women in the first trimester, and 4.5% of women in the second trimester. Hyperemesis gravidarum is the most likely underlying condition. The suppressed TSH with slightly elevated levels of T4 is due to the partial thyroid-stimulating action of beta-HCG. No specific management is indicated. Thyroid function tests are likely to have returned to normal on retesting.

B Start propylthiouracil

At this stage of pregnancy, without overt symptoms of hyperthyroidism and with TSH and T4 only slightly outside the normal range, thionamides aren't indicated.

C Start carbimazole

Like propylthiouracil, carbimazole isn't indicated, because the overserved thyroid blood tests seen here are a normal physiological finding.

D Refer for partial thyroidectomy

Thyroidectomy is indicated for Graves' disease in pregnancy where medical therapy with thionamides is ineffective or contra-indicated.

E Consider radioiodine

Radioiodine is contra-indicated in pregnancy, and treatment isn't indicated because the thyroid function tests seen here are not as a result of thyrotoxicosis, but as a result of excess beta-HCG.

A 22-year-old woman with type 1 diabetes for the past 14 years presents for review. Recent Hb A_{1c} is elevated at 58mmol/mol. Her blood pressure in clinic is 125/80 mmHg. Past history of note includes a number of episodes of cystitis. She has dipstick-positive proteinuria and a timed urine sample confirms elevated urinary albumin excretion. There is no bacterial growth after incubation of a portion of the specimen. Renal ultrasound scan shows normal-sized kidneys.

Which of the following represents the most appropriate management of her proteinuria?

- A Long-term prophylactic antibiotics
- B Transition to an insulin pump
- C Angiotensin-converting enzyme (ACE) inhibition
- D Beta-blocker therapy
- E Calcium antagonist therapy

C Angiotensin-converting enzyme (ACE) inhibition

The EUCLID study looked at the effects of treating normotensive type 1 diabetes patients with microalbuminuria with lisinopril. This showed a 20% reduction in urinary albumin excretion versus placebo, but the active treatment group did also show a 3-mmHg reduction in blood pressure, which may have contributed. A similar study in normotensive type 2 diabetes patients with enalapril demonstrated a reduction in urinary albumin excretion. These two studies together are taken as evidence for ACE inhibition in normotensive microalbuminuric patients.

A Long-term prophylactic antibiotics

Prophylactic antibiotics may have a role in the management of kidney disease associated with vesicoureteric reflux, but used in the context of type 1 diabetes they may merely increase the risk of antibiotic resistance.

B Transition to an insulin pump

Although her Hb A_{1c} is mildly elevated, transition to an insulin pump to drive tighter glycaemic control will only result in a modest impact on renal disease progression.

D Beta-blocker therapy

Beta-blocker therapy is thought to be less effective than ACE inhibitors with respect to reducing proteinuria at a given blood pressure.

E Calcium antagonist therapy

Non dihydropyridine calcium channel antagonists such as diltiazem offer modest benefits in reducing proteinuria, but

A 48-year-old woman is referred to the Endocrine Clinic after routine blood testing at the GP surgery. She has no significant previous medical history; her only recent attendance at the doctor's was after fainting at a wedding when the weather was noted to be rather hot.

There was no other past history of note and examination revealed blood pressure of 112/82 mmHg. No previous history of hypertension was noted, nor any episodes of hypovolaemia.

Investigations:

Hb	12.2 g/dl
WCC	6 × 10^9/l
PLT	197 × 10^9/l
Na^+	141 mmol/l
K^+	3.0 mmol/l
Bicarbonate	32 mmol/l
Creatinine	90 μmol/l

Which of the following investigations would be most useful in pointing to the diagnosis?

A	Renin and aldosterone levels
B	Urinary electrolytes
C	Renal ultrasound scan
D	Renal biopsy
E	Renal angiography

hypovolaemia.

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Which of the following investigations would be most useful in pointing to the diagnosis?

Your answer was incorrect

A Renin and aldosterone levels

B Urinary electrolytes

C Renal ultrasound scan

D Renal biopsy

E Renal angiography

Explanation

A Renin and aldosterone levels

This patient has hypokalaemic alkalosis without evidence of

B Urinary electrolytes

C Renal ultrasound scan

D Renal biopsy

E Renal angiography

Explanation

A Renin and aldosterone levels

This patient has hypokalaemic alkalosis without evidence of hypovolaemia or hypertension. The presentation is typical of Gitelman syndrome presenting at older age, with no symptoms of hypovolaemia. Gitelman is caused by mutation in the thiazide-sensitive NaCl transporter, and resultant salt wasting leads to activation of the renin-angiotensin system also leading to raised aldosterone levels. It is the most common congenital renal tubular disorder in white people, with a prevalence of 1 in 40,000, and is associated with hypocalciuria and hypomagnesaemia. Treatment is with potassium and magnesium replacement. Where patients fail to respond to supplementation, potassium-sparing diuretics may be required to restore serum potassium levels.

B Urinary electrolytes

Urinary electrolytes may reveal low urinary calcium excretion, but this is less useful than renin and aldosterone levels as a pointer to the underlying diagnosis.

C Renal ultrasound scan

magnesium replacement. Where patients fail to respond to supplementation, potassium-sparing diuretics may be required to restore serum potassium levels.

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C	Renal ultrasound scan

Renal ultrasound scanning is most useful in identifying kidney diameter as a pointer to the underlying cause of hypertension, rather than pointing to the cause of hypokalaemia when blood pressure is normal.

D	Renal biopsy

Although not required for diagnosis, renal biopsy in Gitelman reveals hyperplasia of the juxtaglomerular apparatus and prominence of medullary interstitial cells. It is most useful in identifying the pathology underlying other causes of tubular dysfunction.

E	Renal angiography

Renal angiography is considered post-renal ultrasound in the event that there is hypertension, differential kidney sizing, hypokalaemia, and hyper-reninaemic hyperaldosteronism, because of increased likelihood of renal artery stenosis as the underlying diagnosis.

Rate this question:

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A 42-year-old man with a 30-year history of type 1 diabetes comes to the clinic complaining of frequent falls. On two occasions he has fainted and knocked his head and had to be taken to the Emergency Department, and at other times he was dizzy, but a short period sitting down improved things for him. He has a history of peripheral neuropathy and erectile dysfunction. He takes a basal bolus insulin regime involving insulin glargine and meal time Novorapid™. He also takes ramipril 5 mg/day for renoprotection and indapamide 2.5 mg. On examination his BP is 145/80 mmHg with a postural drop of 35 mmHg systolic. He has signs consistent with peripheral sensory neuropathy to the mid-shin.

Investigations:

Hb	12.2 g/dl
WCC	5.4 x 10^9/l
PLT	201 x 10^9/l
Na^+	139 mmol/l
K^+	4.9 mmol/l
Creatinine	122 μmol/l
HbA1c	50 mmol/ml (6.73%)

Which of the following is the most appropriate next intervention?

A Elastic stockings

B Fludrocortisone

C Reduce prandial insulin

D Reduce background insulin

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C Reduce prandial insulin

D Reduce background insulin

E Stop indapamide

Question 21 of 212

E Stop indapamide

This patient has peripheral neuropathy and almost certainly has significant autonomic neuropathy, which accounts for the large postural drop in his blood pressure. A standing BP of 110 mmHg systolic is clearly acceptable, and therefore the most obvious first step is in stopping his indapamide and monitoring his blood pressure over the subsequent 2-4 weeks. If he still has significant postural hypotension then the next steps would be to add elastic stockings, followed by fludrocortisone. The history of pre-syncope is much more suggestive of changes in blood pressure rather than changes in blood glucose.

A Elastic stockings

Elastic stockings are a potential intervention for patients who have persistent postural hypotension despite discontinuing the thiazide-like diuretic.

B Fludrocortisone

Fludrocortisone is considered for patients who fail to respond to conservative measures such as elastic stockings.

C Reduce prandial insulin

The postural drop in blood pressure points to hypotension rather than hypoglycaemia as the cause of this patient's collapse.

D Reduce background insulin

Excess background insulin is primarily associated with fasting hypoglycaemia, which is not the cause of this patient's collapse given the obvious postural hypotension.

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A 48-year-old woman presents with a two-week history of malaise and anterior neck pain. She tells you she has been suffering from what seems like a severe flu-like illness. On examination her pulse is 118 and regular and her blood pressure is 132/74 mmHg. She has a fine tremor and her palms are moist. She has a slightly enlarged, smooth tender thyroid.

Investigations:

T_4	40 nmol/l
TSH	<0.01 mU/l
ESR	40 mm/h

Which of the following is the most likely diagnosis?

A Toxic multinodular goitre

B Graves' disease

C Toxic solitary nodule

D Medullary carcinoma of the thyroid

E Subacute thyroiditis

Question 22 of 212

Explanation

E Subacute thyroiditis

This is a description of subacute (De Quervain's) thyroiditis, which usually presents with malaise and neck pain. The neck pain can radiate to the ear or occiput. There is often tenderness and nodularity of the thyroid. ESR is often elevated. A Technetium-99m scan shows no technetium uptake by the thyroid. Mild cases can be treated with non-steroidal anti-inflammatory drugs (NSAIDs), but more severe cases associated with hyperthyroidism should be treated with prednisolone 30 mg/day. The prednisolone can be stopped when the T_4 normalises. Treatment with carbimazole is not indicated.

A Toxic multinodular goitre

A nodular enlarged thyroid gland is expected in toxic multinodular goitre, with a more prolonged period of symptoms of hyperthyroidism.

B Graves' disease

Graves' is associated with smooth enlargement of the thyroid, often with only mild tenderness. Symptoms of thyrotoxicosis also occur over a more prolonged period.

C Toxic solitary nodule

Toxic adenoma is not associated with generalised tenderness of the thyroid gland, and symptoms of thyrotoxicosis build up over a period of weeks and months.

D Medullary carcinoma of the thyroid

Medullary carcinoma of the thyroid is a C-cell (calcitonin-

A 45-year-old lady with diabetes mellitus presents with this ulcer on her foot. Her posterior tibial pulses are easily felt, but her dorsalis pedis pulses are not palpable. Pinprick and vibration perception are absent from the knee down.

Sole of the patient's left foot.

Which of the following represents the likely aetiology of this ulcer?

A Primary infection

B Diabetic peripheral neuropathy

C Combined neuropathy and arterial insufficiency

D Venous insufficiency

E Arterial insufficiency

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Explanation

B | **Diabetic peripheral neuropathy**

This is a typical neuropathic ulcer, with callus forming the edge and a clean base. These are commonly found on the pressure points of the feet and are painless. Ten per cent of people have absent dorsalis pedis pulses; therefore, their absence does not indicate ischaemia. Off-loading is the key intervention with respect to driving successful ulcer healing, although many patients find this difficult to achieve.

C | **Combined neuropathy and arterial insufficiency**

There are no features such as pallor, cold extremities and trophic changes including loss of hair and nail dystrophy to suggest arterial insufficiency.

A | **Primary infection**

Around 50% of diabetic foot ulcers may become infected, although primary infection is not the usual cause of plantar lesions like this.

D | **Venous insufficiency**

Venous insufficiency results in ulceration with slough and debris formation, primarily over the medial malleolus.

E | **Arterial insufficiency**

Arterial insufficiency results in loss of temperature in the feet, pallor and trophic changes including loss of hair and nail dystrophy. These changes are not seen here.

Diabetic Foot Ulcer Treatment Video

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Feature	Ulcer Type			
	Venous	Arterial	Neuropathic Diabetic	Pressure
Underlying condition	Varicose veins, previous deep-vein thrombosis, obesity, pregnancy, recurrent phlebitis	Diabetes, hypertension, smoking, previous vascular disease	Diabetes, trauma, prolonged pressure	Limited mobility
Ulcer location	Area between the lower calf and the medial malleolus	Pressure points, toes and feet, lateral malleolus and tibial areas	Plantar aspect of foot, tip of the toe, lateral to fifth metatarsal	Bony prominences, heel
Ulcer characteristic	Shallow and flat margins, moderate-to-heavy exudate, slough at base with granulation tissue	Punched out and deep, irregular shape, unhealthy wound bed, presence of necrotic tissue, minimal exudate unless infected	Deep, surrounded by callus, insensate	Deep, often macerated
Condition of leg or foot	Hemosiderin staining, thickening and fibrosis, eczematous and itchy skin, limb edema, normal capillary refill	Thin shiny skin, reduced hair growth, cool skin, pallor on leg elevation, absent or weak pulses, delayed capillary refill, gangrene	Dry, cracked, insensate, calluses	Atrophic skin, loss of muscle mass
Treatment	Compression therapy, leg elevation, surgical management	Revascularization, antiplatelet medications, management of risk factors	Off-loading of pressure, topical growth factors	Off-lo[illegible] reduction of ex[illegible] moist[illegible] friction; adequate nutrition

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Venous, Arterial, Neuropathic Diabetic, and Pressure Ulcers.

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An 18-year-old presents to her GP with a chest infection. The GP takes routine blood tests and notices that her glucose is just into the range for diabetes. He refers her to the Diabetic Clinic, where you see her and take a full history. At the time of the test, she had been unwell for 1 week with a chest infection. She has no other medical history and is normally fit and well. Her grandmother, mother and sister all have diabetes, which presented when they were young. Her mother's and sister's diabetes is diet-controlled only. Her grandmother has only started to need insulin recently. She has two older brothers who do not have diabetes. Her family are all very health conscious and do not smoke, do not drink excessive alcohol and exercise regularly. They all maintain a BMI around 20.

Her fasting venous glucose is 12 mmol/l.

How would you best describe the likely diagnosis in her case?

A	Incidental hyperglycaemia
B	Type-1 diabetes mellitus
C	Type-2 diabetes mellitus
D	Syndrome X
E	Maturity-onset diabetes of the young (MODY)

regularly. They all maintain a BMI around 20.

Her fasting venous glucose is 12 mmol/l.

How would you best describe the likely diagnosis in her case?

Your answer was correct

A	Incidental hyperglycaemia
B	Type-1 diabetes mellitus
C	Type-2 diabetes mellitus
D	Syndrome X
E	Maturity-onset diabetes of the young (MODY)

Explanation

E Maturity-onset diabetes of the young (MODY)

Maturity-onset diabetes is a genetic subgroup of diabetes characterised by autosomal-dominant inheritance, early onset, non-insulin-dependent diabetes and results from a monogenic defect leading to defects of either insulin sensing or insulin release. MODY3 is particularly important to diagnose as many patients initially treated with insulin can in fact be managed with sulphonylurea.

A Incidental hyperglycaemia

The FPG result of 12 is well into the abnormal range. Coupled with the probable autosomal-dominant inheritance of diabetes, MODY is the more likely diagnosis.

Table 1. Classification of subtypes of MODY diabetes

MODY subtype	GEN	Monogenic phenotype
MODY 1	HNF4A	Progressive and severe ß-cell dysfunction.
MODY 2	Glucokinase (GCK)	Mild to moderate and stable hyperglycaemia; glucose regulation exists, but at a higher level.
MODY 3	HNF1A (TCF1)	Progressive and severe ß-cell dysfunction.
MODY 4	IPF-1 (PDX1)	Progressive and severe ß-cell dysfunction. Pancreatic agenesis if the mutation is homozygous.
MODY 5	HNF1 B (TCF2)	Progressive and severe ß-cell dysfunction; renal and genital abnormalities.
MODY 6	Neuro D1	Progressive and moderately severe ß-cell dysfunction.
MODY 7	CEL (Carboxyl ester lipase)	Variable diabetes. Exocrine pancreatic insufficiency.

Adapted from Weedon, Frayling and Raeder[27-28]

GuíaSalud. CPG Diabetes Mellitus. English full version. Definition.

MODY diabetes is considered a monogenic disease, of autosomal dominant inheritance (presence of the mutation in heterozygosity), and currently at least ...

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MODY subtypes (4 most common in descen...
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Clinical features
Age of diagnosis
Sex
BMI
Duration of diabetes

Treatment
Current treatment
Time to continuous insulin therapy
HbA_{1c}

Family history
Parental history of diabetes

MODY probability calculator

Other useful information
Birthweight
Neonatal complications
Glycosuria
Other clinical features

Biomarkers
C-peptide >200 pmol/l
Islet autoantibodies negative

MODY genetic testing

***HNF1A*-MODY**
Progressive beta cell dysfunction
Glycosuria

***HNF4A*-MODY**
Progressive beta cell dysfunction
Fetal macrosomia
Neonatal hypoglycaemia

***GCK*-MODY**
Stable beta cell function
Stable mildly raised glucose

***HNF1B*-MODY**
Beta cell developmental defect
Exocrine pancreas deficiency
Other organ developmental defects
e.g kidney, uterus

Low-dose sulfonylureas

No treatment required

Insulin

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A 16-year-old girl of Greek origin comes to the clinic with failure to maintain normal growth and development. She has Beta-thalassaemia major and receives regular blood transfusions to maintain her Hb in the range of 9-10 g/dl. You arrange some blood tests:

Investigations;

Hb	95 g/dl
WCC	7.1 × 10⁹/l
PLT	174 × 10⁹/l
Na^+	130 mmol/l
K^+	5.3 mmol/l
Creatinine	90 μmol/l
Free T4	6.5 nmol/l
9am cortisol	52 nmol
IGF-1	2.5 nmol/l (9.3-56)
FSH	0.2

Which of the following is the most appropriate replacement therapy to begin with?

A Growth hormone

B Hydrocortisone

C Oestrogen

D Thyroxine

E Fludrocortisone

D	Thyroxine
E	Fludrocortisone

Explanation

B	Hydrocortisone

This patient has pituitary dysfunction, which has almost certainly been caused by iron overload. Her blood testing is consistent with a diagnosis of pan-hypopituitarism, but it is corticosteroid replacement that is essential first to avoid the possibility of precipitating an adrenal crisis.

A	Growth hormone

Although chronic growth hormone deficiency is associated with tiredness, lethargy and a reduction in muscle mass, it is hydrocortisone that is the more important replacement therapy to start first.

C	Oestrogen

Sex hormone replacement is important, particularly to enable this patient to maintain good bone health, but it can be commenced later.

D	Thyroxine

Thyroxine replacement is essential, but should be begun shortly after hydrocortisone has commenced to avoid precipitating an adrenal crisis.

E	Fludrocortisone

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Thyroxine replacement is essential, but should be begun shortly after hydrocortisone has commenced to avoid precipitating an adrenal crisis.

E Fludrocortisone

This is only necessary in patients with adrenal insufficiency who are unable to maintain normal blood pressure control.

You review a 32-year-old man with a history of type 1 diabetes who is complaining of tiredness, lethargy and weight loss. He also tells you that he has fainted on three occasions over the past 2 months. He admits to nausea and vomiting. He has been working in Spain for some months.

On examination, he is very thin and you notice he is tanned. His blood pressure is 102/65 mmHg, with a postural drop of 12 mmHg on standing.

Investigations:

T4	5.7 pmol/l (10-22)
Na^+	132 mmol/l
K^+	5.2 mmol/l
Glucose	5.8 mmol/l
Urea	9.1 mmol/l

He has a normochromic, normocytic anaemia.

Which one of the following is the best way to diagnose the cause of his symptoms?

A	9 am cortisol and ACTH measurement
B	Thyroid auto-antibodies
C	CT head scan
D	Urine sodium and osmolality
E	Transferrin saturation

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Your answer was correct

A 9 am cortisol and ACTH measurement

B Thyroid auto-antibodies

C CT head scan

D Urine sodium and osmolality

E Transferrin saturation

Explanation

A 9 am cortisol and ACTH measurement

This man has adrenal insufficiency until proven otherwise.

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A — 9 am cortisol and ACTH measurement

This man has adrenal insufficiency until proven otherwise. This is illustrated by his blood picture of hyponatraemia, hyperkalaemia (levels may have been blunted by vomiting), raised urea and normochromic normocytic anaemia. Nine am cortisol and adrenocorticotrophic hormone (ACTH) levels are a very sensitive way to detect adrenal insufficiency, with inappropriately low cortisol levels compared to raised ACTH levels indicating a positive diagnosis.

Around 70% of cases of adrenal insufficiency occur due to autoimmune destruction of the adrenal glands, adrenal insufficiency occurring with increased frequency in patients with a history of type 1 diabetes or other autoimmune disease. Malignant destruction and infection by tuberculosis are other possible causes.

B — Thyroid auto-antibodies

Thyroid dysfunction is likely to be as a result of the severe non-thyroidal illness, and antibody testing is therefore of no value here. Raised thyroid-stimulating hormone (TSH) and reduced T4 levels are often seen at the point of diagnosis of hypoadrenalism. Commencing thyroid hormone replacement may actually worsen the adrenal crisis, and thyroid function testing should be repeated a few weeks after stabilising glucocorticoid replacement.

C — CT head scan

Given this patient has increased skin pigmentation, hypoadrenalism related to adrenal rather than pituitary failure is much more likely here, and hence CT head is not of value.

D — Urine sodium and osmolality

tuberculosis are other possible causes.

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C CT head scan

Given this patient has increased skin pigmentation, hypoadrenalism related to adrenal rather than pituitary failure is much more likely here, and hence CT head is not of value.

D Urine sodium and osmolality

Relative dehydration and increased urinary sodium loss are both likely consequences of hypoadrenalism. Urine assay of sodium and osmolality won't, however, determine the underlying cause.

E Transferrin saturation

Transferrin saturation is useful in diagnosing haemochromatosis, which does present with increased skin pigmentation, although this is against a background of a type 2 diabetes-like picture with arthritis and erectile dysfunction due to low levels of testosterone.

A 24-year-old woman presents to her general practitioner (GP) for a 10 week early pregnancy check. She complains of mild lethargy and he checks some thyroid function tests. Thyroid-stimulating hormone (TSH) is 0.3 mU/l (0.4–5) and free thyroxine (T_4) is 27 pmol/l (10–22). He diagnoses thyrotoxicosis and refers her to you for an opinion.

What is the best next management step for this patient?

A	Observation
B	Start carbimazole therapy
C	Start propylthiouracil therapy
D	Refer for radioiodine
E	Refer for thyroid uptake scan

6465

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What is the best next management step for this patient?

Your answer was correct

A Observation

B Start carbimazole therapy

C Start propylthiouracil therapy

D Refer for radioiodine

E Refer for thyroid uptake scan

Explanation

A Observation

This patient has no symptoms of thyrotoxicosis, with a thyroid-stimulating hormone (TSH) level just below the normal range and a thyroxine (T_4) just above the normal range. It is a feature of normal pregnancy that triiodothyronine (T_3) and T_4 levels show a slight increase in the first trimester due to human chorionic gonadotrophin (HCG) stimulation. TSH may be mildly suppressed in up to 13.5% of pregnancies during the first trimester, and this is

D Refer for radioiodine

E Refer for thyroid uptake scan

Explanation

A Observation

This patient has no symptoms of thyrotoxicosis, with a thyroid-stimulating hormone (TSH) level just below the normal range and a thyroxine (T_4) just above the normal range. It is a feature of normal pregnancy that triiodothyronine (T_3) and T_4 levels show a slight increase in the first trimester due to human chorionic gonadotrophin (HCG) stimulation. TSH may be mildly suppressed in up to 13.5% of pregnancies during the first trimester, and this is considered a normal variant. Thyroid-binding globulin has a twofold increase in concentration during pregnancy as a result of reduced hepatic clearance and increased synthesis under oestrogen stimulus. The rise plateaus out at week 20 and then begins to fall in the postpartum period. When there are TSH receptor antibodies present at high concentration they may cross the placenta.

B Start carbimazole therapy

Carbimazole is used for treating *bona fide* thyrotoxicosis in pregnancy, and is used late in pregnancy because of potential risks of propylthiouracil and maternal hepatotoxicity.

C Start propylthiouracil therapy

Propylthiouracil is used for treating thyrotoxicosis in early pregnancy, but in this case the abnormal TFTs are likely to be related to normal physiology.

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C	Start propylthiouracil therapy

Propylthiouracil is used for treating thyrotoxicosis in early pregnancy, but in this case the abnormal TFTs are likely to be related to normal physiology.

D	Refer for radioiodine

Radioiodine is contraindicated in pregnancy because of the risk of causing hypothyroidism in the unborn child.

E	Refer for thyroid uptake scan

This won't inform management in this case, and isotope scanning is avoided if possible in pregnancy.

A 42-year-old type-2 diabetic woman presents with recurrent urinary tract infections. She has been treated with a number of antibiotics including trimethoprim, ciprofloxacin and amoxicillin. She still complains of dysuria and some soreness in her groin. Her most recent Hb A_{1c} was 108 mmol/mol (12%). USS abdomen demonstrated no structural abnormalities or evidence of pyelonephritis.

What is the most likely causative agent?

A	Extended spectrum beta-lactamase-producing *coli*
B	Methicillin-resistant *Staphylococcal aureus* (MRSA)
C	*Candida albicans*
D	*Neisseria gonorrhoea*
E	*Chlamydia trachomatis*

Explanation

A	Extended spectrum beta-lactamase-producing *coli*

Data from the American Diabetes Association have shown that **9.4% of people diagnosed with type 2 diabetes** had a UTI compared to **only 5.7%** of those without. The most common pathogens isolated from the urine of diabetic patients with UTI were *E. coli* and other Enterobacteriaceae such as *Klebsiella* spp., *Proteus* spp., *Enterobacter* spp. and Enterococci.

Multiple courses of antibiotic therapy in these patients, and increased incidence of hospital-acquired and catheter-associated UTI, induce the development of antibiotic-resistant urinary pathogens.

Infection with ESBL-producing *E. coli* is an increasingly recognised cause of infection in diabetes patients and is associated with poor outcomes. ESBLs are enzymes that open the beta-lactam ring, inactivating the antibiotic and consequently conferring resistance to most beta-lactam antibiotics such as pencillins and cephalosporins. Some ESBL isolates have been shown to be resistant to antibiotics commonly used for UTI, such as trimethoprim and ciprofloxacin.

Carbapenems are generally considered the drug of choice for the treatment of ESBL/*E. coli* (ESBL-EC) infections. With a half-life of 4 h, ertapenem is commonly used as it is administered only once daily. Fosfomycin is an oral antibiotic agent that has broad activity against multi-drug-resistant pathogen, including ESBL-EC. Another oral antimicrobial agent that can be considered for the treatment of ESBL-EC cystitis is nitrofurantoin.

C	*Candida albicans*

Candida urinary tract infections (UTIs) also occur

A 48-year-old man who suffers from epilepsy presents to his general practitioner (GP) for review. His medication has recently been changed after an increase in his fit frequency, and he is now taking carbamazepine.

In the past week, he has complained of increasing headaches, tiredness and lethargy. In addition, his wife reports that he appears intermittently confused at times.

What diagnosis fits best with this clinical picture?

A	Complex partial seizures
B	Temporal lobe epilepsy
C	Drug-related hypernatraemia
D	Drug related hyponatraemia
E	Intra-cranial tumour

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Your answer was correct

A	Complex partial seizures
B	Temporal lobe epilepsy
C	Drug-related hypernatraemia
D	Drug related hyponatraemia
E	Intra-cranial tumour

Explanation

D Drug related hyponatraemia

We are told that this patient has recently commenced carbamazepine therapy, and we are also aware that he is complaining of symptoms that may suggest hyponatraemia. Syndrome of Inappropriate antidiuretic hormone (ADH) secretion (SIADH), is a recognised side effect of carbamazepine therapy. Other drugs that may result in SIADH include vincristine, vinblastine, cyclophosphamide, chlorpropamide, clofibrate

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D	Drug related hyponatraemia
E	Intra-cranial tumour

Explanation

D	Drug related hyponatraemia

We are told that this patient has recently commenced carbamazepine therapy, and we are also aware that he is complaining of symptoms that may suggest hyponatraemia. Syndrome of Inappropriate antidiuretic hormone (ADH) secretion (SIADH), is a recognised side effect of carbamazepine therapy. Other drugs that may result in SIADH include vincristine, vinblastine, cyclophosphamide, chlorpropamide, clofibrate, phenothiazines and monamine oxidase uptake inhibitors. Criteria for diagnosis include normal renal, adrenal and thyroid function, with hyponatraemia and hypotonic plasma (< 270 mOsmol/kg). In addition, urine osmolality should be inappropriately high and there should be excessive renal sodium loss of at least 20 mmol/l. In this case the best treatment option would be to consider switching to another suitable anti-epileptic agent.

A	Complex partial seizures

A complex partial seizure, now known as a focal impaired awareness seizure according to the updated classification system from the International League Against Epilepsy (ILAE), starts focally within the brain and causes impairment of consciousness. In most patients, focal impaired awareness seizures represent underlying temporal lobe epilepsy. Focal impaired awareness seizures typically last 30–120 s. Longer seizures may occur when these become generalised with full-body convulsions or

Temporal lobe seizures often begin with a motionless stare followed by oral or manual automatisms, symptoms and signs which are not present in this scenario.

C	Drug-related hypernatraemia

This is strictly defined as a hyperosmolar condition caused by a decrease in total body water relative to electrolyte content. Hypernatremia is a 'water problem', not a problem of sodium homeostasis. Patients developing hypernatremia outside of the hospital are generally elderly people who are mentally and physically impaired, often with an acute infection.

E	Intra-cranial tumour

Manifestations of intra-cranial tumours nay be non-specific and include headache (new onset or different in nature), altered mental status, ataxia, nausea, vomiting, limb weakness, gait disturbance, focal seizures, fixed visual changes, speech deficits and focal sensory abnormalities.

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A 34-year-old woman presents with weight loss, palpitations and anxiety. Her periods stopped three months ago, but a pregnancy test which she took two weeks ago was negative. She tells you that she has completed her family and has two children aged 9 and 6 years.

On examination, she has a blood pressure (BP) of 126/70 mmHg, her pulse is 92/min at rest and her body mass index (BMI) is 21. She has an obvious left-sided thyroid nodule.

Investigations:

Hb	12.1 g/dl
WCC	5.7×10^9/l
PLT	190×10^9/l
Na^+	139 mmol/l
K^+	4.9 mmol/l
Creatinine	100 μmol/l
TSH	< 0.05 U/l
FNAB	Consistent with adenoma

Which of the following is the most appropriate long-term intervention?

A Subtotal thyroidectomy

B Lugol's iodine

C Carbimazole

D Radioiodine

E Propylthiouracil

Question 30 of 212

investigations:

Hb	12.1 g/dl
WCC	5.7 × 10^9/l
PLT	190 × 10^9/l
Na^+	139 mmol/l
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A	Subtotal thyroidectomy
B	Lugol's iodine
C	Carbimazole
D	Radioiodine
E	Propylthiouracil

Explanation

D	Radioiodine

Radioiodine is highly effective for the treatment of a single

B Lugol's iodine

C Carbimazole

D Radioiodine

E Propylthiouracil

Explanation

D Radioiodine

Radioiodine is highly effective for the treatment of a single toxic adenoma, because the 'hot nodule' avidly takes up radioiodine. If patients are, however, concerned about the possibility of radioactive iodine treatment or there is a suspicion of malignant change within the nodule, then they may be offered subtotal thyroidectomy.

A Subtotal thyroidectomy

This isn't the preferred option because of morbidity associated with surgery.

B Lugol's iodine

This is given for short-term control of thyrotoxicosis to enable unstable patients to progress to surgery.

C Carbimazole

Although anti-thyroid drugs may manage her thyroid function, given there are two definitive alternative interventions, these are preferred.

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A 72-year-old woman is referred to the Endocrine Clinic. Over the past year, she has noticed a change in her facial appearance and has been suffering from headaches. Her general practitioner (GP) has also found it difficult to control her blood pressure and has recently diagnosed her with pre-diabetes.

Her blood pressure is 155/88 mmHg; her pulse is 74 bpm and regular. Her body mass index (BMI) is 24 kg/m^2.

A picture of her face is shown below.

Which of the following is the most useful next outpatient investigation?

A	Abdominal ultrasound scan
B	Computed tomography (CT) head
C	Insulin-like growth factor 1 (IGF-1)
D	Random growth hormone
E	24-hour urinary free cortisol

B Computed tomography (CT) head

Because of the risk of brain imaging detecting an incidentaloma, a biochemical diagnosis of acromegaly is usually made before proceeding to pituitary imaging. Out of the two options, magnetic resonance imaging (MRI) is preferred to CT.

D Random growth hormone

Growth hormone release is pulsatile, and growth hormone itself has a very short half-life. This means that a random growth hormone measurement can miss a diagnosis of acromegaly.

E 24-hour urinary free cortisol

Urinary free cortisol is an initial outpatient investigation for Cushing syndrome, characterised by obesity and impaired glucose tolerance, rather than the changes in facial appearance seen here.

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A 40-year-old man presents to the Hypertension Clinic with difficult-to-control blood pressure. He is now taking ramipril 10 mg daily and amlodipine 10 mg, but his blood pressure is still 153/88 mmHg.

Investigations:

Na^+	145 mmol/l
K^+	3.0 mmol/l
Urea	5.2 mmol/l
Creatinine	85 µmol/l
Renal ultrasound scan	Kidneys normal size

Which of the following represents the best investigation for this patient?

A	Plasma renin, aldosterone and cortisol level
B	Plasma renin, aldosterone and cortisol levels after washout of antihypertensives
C	Echocardiogram
D	Renal angiogram
E	Oral salt loading

Na⁺	145 mmol/l
K⁺	3.0 mmol/l
Urea	5.2 mmol/l
Creatinine	85 µmol/l
Renal ultrasound scan	Kidneys normal size

Which of the following represents the best investigation for this patient?

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C	Echocardiogram
D	Renal angiogram
E	Oral salt loading

Explanation

B	Plasma renin, aldosterone and cortisol levels after washout of antihypertensives

ACE inhibitors may increase plasma renin activity, and calcium antagonists may reduce aldosterone. Hence, renin, aldosterone and cortisol should be measured after a 2-

B Plasma renin, aldosterone and cortisol levels after washout of antihypertensives

ACE inhibitors may increase plasma renin activity, and calcium antagonists may reduce aldosterone. Hence, renin, aldosterone and cortisol should be measured after a 2-week washout period to confirm primary hyperaldosteronism, the most likely diagnosis here. Resection of adenoma leads to resolution of hypertension in around 70% of patients where a discrete adenoma has been identified. Bilateral adrenal hyperplasia may be managed with spironolactone for many years; dexamethasone is the treatment of choice for those with glucocorticoid-suppressible hyperaldosteronism.

A Plasma renin, aldosterone and cortisol level

These investigations are in the context of suspected secondary hypertension (young patient requiring three antihypertensive agents). These need to be performed after washout of his medication, since ACE inhibitors may increase plasma renin activity and calcium antagonists may reduce aldosterone.

C Echocardiogram

It may reveal end organ damage (left ventricular hypertrophy) but it will not clarify the cause of the hypertension.

D Renal angiogram

In young patients with hypertension that is difficult to control, renal artery stenosis is one of the differential diagnoses. In this scenario though, normal-sized kidneys preclude this diagnosis.

D Renal angiogram

In young patients with hypertension that is difficult to control, renal artery stenosis is one of the differential diagnoses. In this scenario though, normal-sized kidneys preclude this diagnosis.

E Oral salt loading

This is one of the tests used to detect autonomous aldosterone secretion. Patients should increase their sodium intake to more than 6 g/day for 3 days with diet and sodium chloride tabs. Potassium supplementation and daily potassium measurements are required for patients with hypokalaemia. Patients perform 24 h urine collection starting on day 3 for sodium and aldosterone. A 24 h urinary aldosterone excretion of more than 12 mcg is consistent with primary aldosteronism, whereas 24 h urinary sodium of 200 mEq indicates adequate intake. This test should not be performed in patients with uncontrolled hypertension, congestive heart failure or arrhythmias.

A 48-year-old woman is reviewed after attending for a wel woman clinic. She finds it difficult to control her weight, often feels tired, and currently has very heavy periods. Apart from this she doesn't have any particular concerns. On examination her BMI is 32 and her BP is 155/92 mmHg. Otherwise clinical examination is unremarkable.

Investigations

Hb	13.2 g/dl
WCC	4.5 $\times 10^9$/l
PLT	201 $\times 10^9$/l
Na^+	140 mmol/l
K^+	4.5 mmol/l
Creatinine	132 µmol/l
Total cholesterol	6.1 mmol/l
Fasting serum triglyceride	3.2 mmol/l (0.45-1.69)

Which of the following tests is most likely to contribute to determining the underlying diagnosis?

A HDL measurement

B HbA1c measurement

C LFTs

D Prolactin

E TFTS

E TFTS

Explanation

E TFTS

The difficulty with weight control, menorrhagia and hypertriglyceridaemia are all features consistent with hypothyroidism. TSH is likely to be elevated above the normal range, with low T3 and T4. Hashimoto's thyroiditis is the commonest cause of hypothyroidism, and the condition is managed with thyroid hormone replacement. Once thyroxine is commenced, periods improve and hypertriglyceridaemia usually begins to resolve without intervention with statin therapy.

A HDL measurement

HDL may be low but it's not contributing to the underlying diagnosis.

B HbA1c measurement

Significantly elevated blood glucose is unlikely to be seen, and even if HbA1c is abnormal it won't illustrate the reason for her weight gain and menorrhagia.

C LFTs

There may be a small elevation in transaminases, but this won't confirm the underlying cause of her symptoms.

D Prolactin

E TFTS

Explanation

E TFTS

The difficulty with weight control, menorrhagia and hypertriglyceridaemia are all features consistent with hypothyroidism. TSH is likely to be elevated above the normal range, with low T3 and T4. Hashimoto's thyroiditis is the commonest cause of hypothyroidism, and the condition is managed with thyroid hormone replacement. Once thyroxine is commenced, periods improve and hypertriglyceridaemia usually begins to resolve without intervention with statin therapy.

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C LFTs

There may be a small elevation in transaminases, but this won't confirm the underlying cause of her symptoms.

D Prolactin

A couple attend for genetic counselling. They have one child with Klinefelter syndrome who was conceived when the mother was 19 years of age. She is now 35 and would like to try for a second child before she is too old.

What is the likelihood of a second male child being affected by Klinefelter?

A	1 in 2
B	1 in 4
C	1 in 8
D	1 in 25
E	1 in 500

B	1 in 4
C	1 in 8
D	1 in 25
E	1 in 500

Explanation

E	1 in 500

Klinefelter, the commonest form of which is XXY, is the result of chromosomal non-dysjunction; as such, it does not follow a mendelian pattern of inheritance. Population studies suggest that the rate of occurrence in live male births is between 1 in 500 and 1 in 1000. The rate of chromosomal non-dysjunction increases with increasing maternal age and increasing paternal age, each parent contributing 50% of the risk. Around 60% of Klinefelter cases do not survive the fetal period.

D	1 in 25

1 in 25-30 represents the carrier frequency amongst Caucasians for the gene responsible for causing cystic fibrosis.

A	1 in 2

This is the risk of inheritance of an autosomal dominant condition where one parent is affected by the condition.

B	1 in 4

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A 27-year-old woman presents to the clinic because of problems with the physical side of her relationship. She is concerned that her breasts leak milk after only minimal stimulation from her boyfriend, and that intercourse is difficult as she has significant problems with vaginal dryness. She also reports that she has not had a period for the past 4 months. The only other history of note is that she was given metoclopramide by a locum doctor for a recent episode of gastroenteritis. On examination her BP is 142/82 mmHg, pulse is 82/min and regular. Cardiovascular, respiratory and abdominal examination is unremarkable. You can produce milk on minimal breast stimulation. She has some peripheral field visual loss.

Investigations:

Hb	12.7 g/dl
WCC	7.6 x 10^9/l
PLT	203 x 10^9/l
Na^+	138 mmol/l
K^+	4.4 mmol/l
Creatinine	100 µmol/l
Prolactin	1005 mU/l (<360)
TSH	7.2 mU/l (0.4-5.0)
Free T4	16.2 pmol/l (10-22)
FSH	0.5 U/l
LH	2.5 U/l

Which of the following is the most likely diagnosis?

A Non-functioning pituitary adenoma

B Metoclopramide-related hyperprolactinaemia

respiratory and abdominal examination is unremarkable. You can produce milk on minimal breast stimulation. She has some peripheral field visual loss.

Investigations:

Hb	12.7 g/dl
WCC	7.6 x 10^9/l
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LH	2.5 U/l

Which of the following is the most likely diagnosis?

A	Non-functioning pituitary adenoma
B	Metoclopramide-related hyperprolactinaemia
C	Microprolactinoma
D	Macroprolactinoma
E	Pregnancy

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A Non-functioning pituitary adenoma

The prolactin isn't raised enough to be consistent with a macroprolactinoma, and the peripheral visual field loss raises the possibility of a large tumour. The low FSH and LH are consistent with this; the raised TSH may be due to either local compression or the fact that so called non-functioning adenomas may occasionally secrete small amounts of TSH. This woman should undergo a magnetic resonance imaging (MRI) scan to further characterise the tumour. However it is likely that surgery will be the mainstay of therapy as the tumour is highly unlikely to respond significantly to somatostatin or dopamine agonists.

B Metoclopramide-related hyperprolactinaemia

Drug-related hyperprolactinaemia is usually associated with a lesser rise in prolactin, to <1000.

C Microprolactinoma

Microprolactinomas are not associated with visual field loss, and a greater rise in prolactin would be expected in microprolactinoma.

D Macroprolactinoma

Macroprolactinomas are associated with the visual disturbance seen here, although a rise in prolactin to at least 5000 mU/l would be expected.

E Pregnancy

Although pregnancy is associated with a rise in prolactin, i isn't associated with the visual field defect seen here.

A 45-year-old teacher presents with a tingling sensation in the fingers of both hands, especially the thumb and index fingers, which is worse at night and disturbs his sleep. He also describes aching pain in his forearms, exacerbated by carrying heavy objects. He describes polydipsia and generalised aches and pains, and his wife has commented that he must have put on weight as his wedding ring no longer fits.

Clinical examination confirms reproducible sensory loss to pinprick in both hands, particularly over the thumb, index and middle fingers, but is otherwise unremarkable. His blood pressure is 150/96 mmHg. His general practitioner has recently performed a fasting glucose which was 8.4 mmol/l. You suspect he has carpal tunnel syndrome and arrange nerve conduction studies.

He has abnormal facial features, which are shown below.

By Philippe Chanson and Sylvie Salenave [CC BY 2.0 (https://creativecommons.org/licenses/by/2.0)], via Wikimedia Commons

Which of the following is the next most appropriate step in his management?

A	Random growth hormone (GH) level
B	Oral glucose tolerance test (OGTT) with GH measurement
C	Magnetic resonance imaging (MRI) of the pituitary fossa

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and middle fingers, but is otherwise unremarkable. His blood pressure is 150/96 mmHg. His general practitioner has recently performed a fasting glucose which was 8.4 mmol/l. You suspect he has carpal tunnel syndrome and arrange nerve conduction studies.

He has abnormal facial features, which are shown below.

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Which of the following is the next most appropriate step in his management?

A Random growth hormone (GH) level

B Oral glucose tolerance test (OGTT) with GH measurement

C Magnetic resonance imaging (MRI) of the pituitary fossa

D Pituitary function tests

E Visual field testing

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Explanation

B Oral glucose tolerance test (OGTT) with GH measurement

This man has presented with bilateral carpal tunnel syndrome which, in association with macroglossia, prognathism, frontal bossing, enlarged hands, arthralgia, diabetes and hypertension (although a one-off measurement), strongly suggests a diagnosis of acromegaly. This is a rare disease, usually presenting at 30 50 years, and is due to hypersecretion of GH from a pituitary tumour.

Random GH measurement may show increased secretion, but levels vary diurnally and are therefore not diagnostic. The OGTT is definitive, with samples collected for glucose and GH at intervals of 30 minutes (0–150 minutes). Normally, GH is suppressed, but not in acromegaly (levels may rise).

A Random growth hormone (GH) level

GH levels display diurnal variation, and therefore a random level may be falsely normal or low.

C Magnetic resonance imaging (MRI) of the pituitary fossa

The first step in the management is to confirm the GH excess via OGTT. Subsequently, MRI/computed tomography (CT) of the pituitary is used to visualise the tumour and trans-sphenoidal surgery is usually the treatment of choice. Irradiation is used in older patients or following failed surgery. If the OGTT confirms the diagnosis, then MRI/CT plus surgery and investigation/management of other complications (visual fields, pituitary function, echocardiogram, etc.) is indicated

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D	Pituitary function tests

Pituitary function tests are indicated once the diagnosis of acromegaly is confirmed. A full pituitary profile would include testing the thyroid, gonadal and adrenal axis (thyroid-stimulating hormone (TSH), free thyroxine (fT4), follicle-stimulating hormone (FSH), luteinising hormone (LH), testosterone, cortisol).

E	Visual field testing

Formal visual field assessment is indicated once the presence of an adenoma is confirmed on MRI pituitary.

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A 31-year-old woman is referred by her GP as an emergency. She gives a history of malaise and weight loss. Most recently she collapsed at home and has suffered from persistent vomiting over the past 24 hours. Other past history of note includes a deep vein thrombosis in pregnancy and positive screen for anti-phospholipid antibody syndrome.

Investigations:

Na$^+$	128 mmol/l
K$^+$	6.0 mmol/l
Urea	9.1 mmol/l
Creatinine	128 micromol/l
Hb	10.1 g/dl
MCV	99 fl
ESR	41 mm/1st hr
Glucose	3.1 mmol/l

You arrange for a blood sample to be sent for cortisol and give a bolus of 20% dextrose.

Which of the following is the most appropriate next step in managing this patient?

A	Arrange a short synacthen test for the following morning
B	Start prednisolone 30 mg PO OD
C	Start fludrocortisone 100 mcg PO OD
D	Start IV fluid replacement with 5% dextrose

Investigations:

Na⁺	128 mmol/l
K⁺	6.0 mmol/l
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C	Start fludrocortisone 100 mcg PO OD
D	Start IV fluid replacement with 5% dextrose
E	Start IV fluid replacement with 0.9% saline and give a bolus of IV hydrocortisone

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E Start IV fluid replacement with 0.9% saline and give a bolus of IV hydrocortisone

This woman has anti-phospholipid antibody syndrome, which may have led to adrenal infarction, precipitating this presentation with an Addisonian crisis. Autoimmune disease is the commonest cause of Addison's in the developed world, although malignancy and infection (e.g. with tuberculosis) may also be responsible. Initial treatment is with rehydration, and several litres of normal saline may be required during the first 24 h of therapy. A bolus of hydrocortisone 100 mg IV should also be given. If the patient is able to take oral medication, this can then be given as regular oral hydrocortisone or could be given IM i needed.

C Start fludrocortisone 100 mcg PO OD

Fludrocortisone replacement is not normally required in the acute stage, but can be added once the dose of hydrocortisone is reduced after a few days.

A Arrange a short synacthen test for the following morning

This lady is presenting with an Addisonian crisis - you should not wait for a synacthen test prior to commencing therapy.

B Start prednisolone 30 mg PO OD

Hydrocortisone is the steroid of choice in the treatment of Addison's.

D Start IV fluid replacement with 5% dextrose

Hypotension should be managed with aggressive fluid

You review a 19-year-old student who presents with delayed puberty. He has so far been unable to form relationships and feels any time he meets a potential female partner everything breaks down at the physical stage. Examination reveals sparse body hair and underdeveloped penis with small testes. Blood pressure and BMI are both normal. He is also anosmic.

Investigations:

testosterone	5 nmol/l (9-35)
FSH	0.69 U/l (1-7)
LH	0.57 U/l (1-10).
TSH	1.2 U/l (0.5-4.5)

What diagnosis fits best with this clinical picture?

A	Kallman syndrome
B	Klinefelter syndrome
C	Androgen insensitivity syndrome
D	Pan-hypopituitarism
E	Turner syndrome

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What diagnosis fits best with this clinical picture?

Your answer was correct

A Kallman syndrome

B Klinefelter syndrome

C Androgen insensitivity syndrome

D Pan-hypopituitarism

E Turner syndrome

Explanation

A Kallman syndrome

Kallman syndrome results from disordered migration of gonadotropin-releasing hormone (GnRH)-producing neurons into the hypothalamus. This leads to failure of episodic GnRH secretion and subsequent failure of

gonadotropin-releasing hormone (GnRH)-producing neurons into the hypothalamus. This leads to failure of episodic GnRH secretion and subsequent failure of luteinising hormone (LH), follicle-stimulating hormone (FSH) and testosterone production. Seventy-five per cent of sufferers have absent sense of smell (anosmia). It occurs in 1 in 10,000 males, being rarer in females (male:female ratio 4: 1). The syndrome is also associated with an increased risk of cleft lip and palate and sensorineural deafness.

B	Klinefelter syndrome

Klinefelter syndrome is associated with small testes and low levels of testosterone, but isn't associated with loss of sense of smell.

C	Androgen insensitivity syndrome

AIS is associated with female external genitalia, rather than the male phenotype seen here.

D	Pan-hypopituitarism

The normal-range TSH in the absence of symptoms of hypothyroidism counts against a diagnosis of pan-hypopituitarism.

E	Turner syndrome

Turner syndrome is associated with short stature, cardiovascular abnormalities and female external genitalia.

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which is currently managed with diet. On examination his BP is 142/82 mmHg, with pulse is 76/min and regular. He looks particularly tanned. You count a number of spider naevi on examination of his upper chest and you notice that his pubic hair seems a little sparse. His BMI is 31.

Investigations:

Hb	12.9 g/dl
WCC	8.1 x10⁹/l
PLT	190 x10⁹/l
Na⁺	139 mmol/l
K⁺	4.5 mmol/l
Creatinine	134 µmol/l
ALT	182 U/l
Bilirubin	65 µmol/l
Glucose	11.1 mmol/l
Right knee x-ray	chondrocalcinosis

Which of the following tests would you carry out next?

A Serum calcium

B Serum ferritin

C Serum copper

D Urinary copper

E Hepatitis serology

A 42-year-old man presents with chronic right knee pain. He lives and works in Italy and only returns to the UK intermittently to see his family. He has a history of type 2 diabetes mellitus diagnosed last time he was in the UK, which is currently managed with diet. On examination his BP is 142/82 mmHg, with pulse is 76/min and regular. He looks particularly tanned. You count a number of spider naevi on examination of his upper chest and you notice that his pubic hair seems a little sparse. His BMI is 31.

Investigations:

Hb	12.9 g/dl
WCC	8.1 x10^9/l
PLT	190 x10^9/l
Na$^+$	139 mmol/l
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Creatinine	134 µmol/l
ALT	182 U/l
Bilirubin	65 µmol/l
Glucose	11.1 mmol/l
Right knee x-ray	chondrocalcinosis

Which of the following tests would you carry out next?

Your answer was correct

A	Serum calcium
B	Serum ferritin

Explanation

B Serum ferritin

The suspicion is that he has so-called bronze diabetes, or haemochromatosis, associated with chronic liver disease, diabetes mellitus and chondrocalcinosis. The condition occurs because of an inherited mutation on chromosome 6 which affects the way that the transferrin receptor binds t transferrin, and leads to iron accumulation. It is this which results in organ damage and consequent chronic liver disease and diabetes mellitus. The C282Y mutation is foun in the majority of patients with haemochromatosis, and thi can be screened for using a widely available genetic test. Ferritin is usually elevated in association with haemochromatosis, and is a useful initial screening test. It is not specific for haemochromatosis, however, as ferritin may be elevated in chronic liver disease *per se*. It is usually followed by transferrin saturation testing and genetic screening.

A Serum calcium

Although hypercalcaemia is associated with chondrocalcinosis, it's haemochromatosis which is more likely to be the primary cause here.

C Serum copper

Disordered copper metabolism is the cause of Wilson's disease, where patients usually present at an earlier age either with unexplained abnormal liver function, psychiatri disturbance, or chorea, more marked on one side than the other.

D Urinary copper

This is part of the work up for Wilson's disease, which

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C	Serum copper

Disordered copper metabolism is the cause of Wilson's disease, where patients usually present at an earlier age either with unexplained abnormal liver function, psychiatric disturbance, or chorea, more marked on one side than the other.

D	Urinary copper

This is part of the work-up for Wilson's disease, which presents at an earlier age with neurological impairment or unexplained abnormal liver function tests.

E	Hepatitis serology

For viral hepatitis, presentation with diabetes mellitus or chondrocalcinosis would not be expected.

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A 62-year-old man with a known history of type 2 diabetes comes to the Emergency Department having taken an overdose of an unknown quantity of tablets some 3 hours earlier.

e refuses to discuss what he took, but his last discharge suggests he is taking a number of medications including metformin, gliclazide, ramipril, aspirin and atorvastatin.

You review his arterial blood gas results, which are shown below:

PO_2	10.4 kPa
PCO_2	3.9 kPa
Bicarbonate	16 mmol/l
pH	7.36

Which of the following is the most likely explanation for the blood gas results?

A	Compensated metabolic acidosis
B	Compensated respiratory alkalosis
C	Compensated respiratory acidosis
D	Compensated metabolic alkalosis
E	Normal blood gas result

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Which of the following is the most likely explanation for the blood gas results?

Your answer was correct

A Compensated metabolic acidosis

B Compensated respiratory alkalosis

C Compensated respiratory acidosis

D Compensated metabolic alkalosis

E Normal blood gas result

Explanation

A Compensated metabolic acidosis

This man's bicarbonate is below the lower limit of normal, and he is blowing off CO_2 to allow him to maintain a

Explanation

A Compensated metabolic acidosis

This man's bicarbonate is below the lower limit of normal, and he is blowing off CO_2 to allow him to maintain a normal pH. In this context, given that he is taking metformin, he may have overdosed on it leading to presentation with raised anion gap acidosis. His other results, including his chloride, could be scrutinised to confirm this suspicion.

B Compensated respiratory alkalosis

This is seen in the first few hours after aspirin overdose, and in this case is associated with vomiting and tinnitus.

C Compensated respiratory acidosis

This occurs in patients with chronic obstructive pulmonary disease (COPD), and is associated with an elevated pCO_2 and bicarbonate.

D Compensated metabolic alkalosis

This is seen in persistent vomiting, although respiratory compensation is limited by a compulsion to breathe and maintain adequate oxygenation.

E Normal blood gas result

The bicarbonate is below the lower limit of normal, as is th PCO_2.

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This is seen in the first few hours after aspirin overdose, and in this case is associated with vomiting and tinnitus.

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This occurs in patients with chronic obstructive pulmonary disease (COPD), and is associated with an elevated pCO_2 and bicarbonate.

D Compensated metabolic alkalosis

This is seen in persistent vomiting, although respiratory compensation is limited by a compulsion to breathe and maintain adequate oxygenation.

E Normal blood gas result

The bicarbonate is below the lower limit of normal, as is th PCO_2.

A 25-year-old gentleman is referred by his GP to the Endocrine Clinic with weight loss and polyuria. You note his blood pressure to be 125/82 mmHg with a postural drop of 20 mmHg on standing. His BMI is 23. You also note that he has vitiligo.

Investigations (by his GP):

Na^+	125 mmol/l
K^+	6.0 mmol/l
Urea	8.0 mmol/l
Creatinine	120 µmol/l
Glucose	12.5 mmol/l
Ca^+	2.15 mmol/l
T_4	8.0 pmol/l
TSH	20 mU/l

What is the most likely diagnosis?

A	Lysosomal acid lipase deficiency
B	DIDMOAD syndrome
C	Polyglandular syndrome type 1
D	Polyglandular syndrome type 2
E	Multiple endocrine neoplasia type 1

investigations (by his GP):

Na⁺	125 mmol/l
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TSH	20 mU/l

What is the most likely diagnosis?

Your answer was correct

A	Lysosomal acid lipase deficiency
B	DIDMOAD syndrome
C	Polyglandular syndrome type 1
D	Polyglandular syndrome type 2
E	Multiple endocrine neoplasia type 1

Explanation

D Polyglandular syndrome type 2

Autoimmune polyglandular syndrome type 2 is the association of primary adrenal insufficiency with primary

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B	DIDMOAD syndrome
C	Polyglandular syndrome type 1
D	Polyglandular syndrome type 2
E	Multiple endocrine neoplasia type 1

Explanation

D Polyglandular syndrome type 2

Autoimmune polyglandular syndrome type 2 is the association of primary adrenal insufficiency with primary hypothyroidism and type 1 diabetes. Sometimes, primary gonadal failure is present as well. Both type 1 and type 2 polyglandular syndrome are associated with vitiligo and pernicious anaemia.

A Lysosomal acid lipase deficiency

LAL deficiency, also known as Wolman syndrome, is characterised by primary adrenal failure, hepatosplenomegaly and steatorrhoea.

B DIDMOAD syndrome

DIDMOAD syndrome is characterised by Diabetes Insipidus, Diabetes Mellitus, Optic Atrophy and Deafness and is a mitochondrial rather than an autoimmune disorder.

D Polyglandular syndrome type 2

Autoimmune polyglandular syndrome type 2 is the association of primary adrenal insufficiency with primary hypothyroidism and type 1 diabetes. Sometimes, primary gonadal failure is present as well. Both type 1 and type 2 polyglandular syndrome are associated with vitiligo and pernicious anaemia.

A Lysosomal acid lipase deficiency

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B DIDMOAD syndrome

DIDMOAD syndrome is characterised by Diabetes Insipidus, Diabetes Mellitus, Optic Atrophy and Deafness and is a mitochondrial rather than an autoimmune disorder.

C Polyglandular syndrome type 1

Type 1 polyglandular syndrome is characterised by two or more of the following: hypoparathyroidism (90%), primary adrenal insufficiency (60%), chronic mucocutaneous candidiasis, primary gonadal failure and primary hypothyroidism.

E Multiple endocrine neoplasia type 1

MEN1 is associated with pancreatic tumours, including insulinomas and glucagonomas, rather than the development of adrenal insufficiency and diabetes seen here.

A 65-year-old woman presents with vomiting, anorexia, and polyuria. She is a non-smoker. Her GP has been treating her for anaemia with iron supplements, although she tells you this has had little or no effect on feelings of increasing lethargy over the past few months.

On examination, her BP is 122/82, pulse is 88 and regular. She looks pale.

Investigations:

Na^+	141 mmol/l
K^+	3.6 mmol/l
Bilirubin	20 µmol/l
Urea	12 mmol/l
ALT	30 U/l
ALP	280 U/l
Creatinine	154 µmol/l
Albumin	30 g/l
Total protein	85 g/l
Corrected Ca^{++}	3.0 mmol/l
Phosphate	1.3 mmol/l

You start her on IV normal saline.

Which one of the following would be the best initial investigation to contribute to the underlying diagnosis?

A	Sesta MIBI scan of the neck
B	CT chest
C	Abdominal X-ray

Na⁺	141 mmol/l
K⁺	3.6 mmol/l
Bilirubin	20 µmol/l
Urea	12 mmol/l
ALT	30 U/l
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Corrected Ca⁺⁺	3.0 mmol/l
Phosphate	1.3 mmol/l

You start her on IV normal saline.

Which one of the following would be the best initial investigation to contribute to the underlying diagnosis?

A Sesta MIBI scan of the neck

B CT chest

C Abdominal X-ray

D Ultrasound of the neck

E Skeletal survey

Explanation

E Skeletal survey

This woman has hypercalcaemia without hypophosphataemia. Therefore, malignancy must be considered. The LFTs show increased globulin fraction (TP-ALB) indicating the possibility of myeloma. Therefore, the most appropriate management in this case is IV saline and a skeletal survey. Treatment of myeloma-induced hypercalcaemia is IV saline rehydration. Furosemide therapy with IV saline can be used as an adjunct to increase calcium excretion. IV pamidronate is also useful in reducing the calcium. In myeloma, hypercalcaemia is primarily due to increased osteolysis and high-dose steroids - e.g. prednisolone 40 mg od can rapidly reduce the calcium level. IV pamidronate is also useful in reducing the calcium in resistant cases. The emphasis should be on treating the myeloma with chemotherapy, which will in turn lead to a reduction in the calcium.

A Sesta MIBI scan of the neck

This is most useful if a parathyroid adenoma is suspected. Given the phosphate is in the normal range. this is much less likely versus malignancy as the underlying cause of her hypercalcaemia.

B CT chest

CT chest is most useful in patients with suspected bronchial carcinoma; the absence of a history of smoking and any reports of a cough counts against this as the underlying diagnosis.

C Abdominal X-ray

A 61-year-old man with type 2 diabetes and a recent HbA1 of 83.61 mmol/mol (9.8%) asks for urgent clinic review. He complains of a hot, swollen left foot, which has gradually got worse over the past month.

On examination, there is increased heat over the tarsal-metatarsal joint and the foot is swollen. Dorsalis pedis and posterior tibial pulses are palpable and there is obvious neuropathy.

Investigations:

Hb	12.1 g/dl
WCC	12.1 × 10⁹/l
PLT	204 × 10⁹/l
Na^+	140 mmol/l
K^+	4.5 mmol/l
Creatinine	101 µmol/l
CRP	9 mg/l

Which of the following represents the investigation of choice with respect to the likely diagnosis (where available)?

A Technetium isotope scan

B Indium-labelled white cell scan

C Plain radiograph

D ESR

E Joint aspiration

On examination, there is increased heat over the tarsal-metatarsal joint and the foot is swollen. Dorsalis pedis and posterior tibial pulses are palpable and there is obvious neuropathy.

Investigations:

Hb	12.1 g/dl
WCC	12.1 × 10⁹/l
PLT	204 × 10⁹/l
Na⁺	140 mmol/l
K⁺	4.5 mmol/l
Creatinine	101 μmol/l
CRP	9 mg/l

Which of the following represents the investigation of choice with respect to the likely diagnosis (where available)?

Your answer was incorrect

- A Technetium isotope scan
- B Indium-labelled white cell scan
- C Plain radiograph
- D ESR
- E Joint aspiration

Explanation

Explanation

B Indium-labelled white cell scan

Although not widely available, an indium-labelled white cel scan is the best way to differentiate between infective causes of this clinical presentation and Charcot's arthropathy. It is more stable with respect to labelling of white cells versus other techniques such as technetium, and is therefore less likely for example, to label areas of increased bone turnover.

Charcot's is thought to occur due to increased blood flow as a result of neuropathy. This results in increased osteoclast activity and bone turnover; the foot is then susceptible to often very minor trauma and destructive changes take place. Experts recommend immobilisation fo at least 3 months in an aircast-type non-weight-bearing plaster. This is to allow bone remodelling/repair to occur. Bisphosphonates are a useful adjunct to the healing process as they reduce osteoclast activity. Whilst insulin therapy is likely to improve glycaemic control and slow further progression of neuropathy, it will not affect recovery of the Charcot's joint.

C Plain radiograph

Plain X-rays may show areas of joint destruction but won't differentiate between infection and Charcot's-driven inflammation.

A Technetium isotope scan

Technetium is more likely to label areas of increased bone turnover associated with Charcot's, as well as areas of infection.

D ESR

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A Technetium isotope scan

Technetium is more likely to label areas of increased bone turnover associated with Charcot's, as well as areas of infection.

D ESR

Although ESR may be elevated, it is a non-specific marker of inflammation and therefore won't definitively confirm osteomyelitis here.

E Joint aspiration

Joint aspiration of a foot is technically difficult and painful. Whilst it may deliver a diagnosis of osteomyelitis, where indium-labelled white cell scanning is available, it's preferred.

A 75-year-old lifelong smoker was seen with a 5-day history of wheeze and ankle swelling. He was prescribed diuretics along with some other medications but continued to deteriorate. His BP is 110/60 mmHg with a postural drop of 20 mmHg, and his pulse is 90/min and regular.

Investigations:

Na^+	133 mmol/l
K^+	5.0 mmol/l
Urea	28 mmol/l
Creatinine	200 µmol/l
pH	7.11
$p(CO_2)$	7.0 kPa
$p(O_2)$	6.5 kPa
HCO_3	16 mmol/l

Which one of the following diagnoses best explains the clinical picture and these biochemical results?

A Mixed picture of COPD and cardiac failure with renal hypoperfusion

B Severe COPD

C Pre-kidney disease secondary to diuretics

D Aspirin poisoning

E Acute kidney disease and fluid overload

Explanation

A Mixed picture of COPD and cardiac failure with renal hypoperfusion

This patient has a respiratory acidosis (*p*(CO_2) >6.5 kPa, pH <7.35 and hypoxia) and a metabolic acidosis (low bicarbonate). It's very likely that he has an element of COPD with chronic CO_2 retention and a degree of pulmonary oedema. Treatment with diuretics then leads to renal hypoperfusion, resulting in metabolic acidosis.

B Severe COPD

This would produce a respiratory acidosis with metabolic compensation, which would be reflected by raised bicarbonate level on the ABG.

C Pre-kidney disease secondary to diuretics

Pre-kidney disease on its own would not cause carbon dioxide retention and hypoxia.

D Aspirin poisoning

Symptoms of acute aspirin (acetyl salicylic acid) toxicity include nausea, vomiting, diarrhoea, tinnitus, vertigo, altered mentation, non-cardiogenic pulmonary oedema, hyperpyrexia and coma. Salicylates stimulate the medullar respiratory centre leading to increased rate (tachypnoea) and depth of respiration (hyperventilation). This leads to a fall in pCO_2 and respiratory alkalosis. Later, metabolic acidosis occurs due to accumulation of lactic and other organic acids. The most common acid-base presentation i that of mixed respiratory alkalosis-metabolic acidosis.

E Acute kidney disease and fluid overload

A young female junior doctor is concerned that she has pu on weight since she was a medical student, as she now no longer finds time to exercise. She looks in the British National Formulary for drugs that cause weight loss and decides to try some on a temporary basis. After 2 months, she is successfully losing weight but also has trouble with increased stool frequency. However, she is concerned as she has also noticed difficulty in climbing stairs. She has nc problems walking on the flat, but she also has difficulty getting up out of chairs. She has difficulty in sleeping at th moment but puts that down to increased frequency of headaches for the past 2 months. She asks you, a fellow work colleague, what the cause of her weakness could be.

Which one of the following do you think is the most likely

A	She is just tired from overworking
B	She is abusing thyroxine tablets
C	She is abusing metformin
D	She is abusing insulin injections
E	She is abusing laxatives

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A young female junior doctor is concerned that she has put on weight since she was a medical student, as she now no longer finds time to exercise. She looks in the British National Formulary for drugs that cause weight loss and decides to try some on a temporary basis. After 2 months, she is successfully losing weight but also has trouble with increased stool frequency. However, she is concerned as she has also noticed difficulty in climbing stairs. She has no problems walking on the flat, but she also has difficulty getting up out of chairs. She has difficulty in sleeping at the moment but puts that down to increased frequency of headaches for the past 2 months. She asks you, a fellow work colleague, what the cause of her weakness could be.

Which one of the following do you think is the most likely?

Your answer was incorrect

A	She is just tired from overworking
B	She is abusing thyroxine tablets
C	She is abusing metformin
D	She is abusing insulin injections
E	She is abusing laxatives

Explanation

B She is abusing thyroxine tablets

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Explanation

B She is abusing thyroxine tablets

Thyroxine, metformin and laxatives can all cause weight loss. Her weakness fits with a proximal muscle weakness, which can be caused by hyperthyroidism. She may also be tachycardic, but has not experienced palpitations. Excessive use not only results in proximal muscle weakness but also can cause a tachycardic cardiomyopathy, arrhythmias, palpitations, muscle cramps, diarrhoea, tremors, restlessness, sweating, headaches and insomnia.

C She is abusing metformin

Metformin can cause diarrhoea and headaches, but does not cause muscle weakness as described in this scenario.

A She is just tired from overworking

The increased stool frequency, the weight loss, the headaches and muscle weakness point towards an underlying pathology such as thyrotoxicosis rather than simply overworking.

D She is abusing insulin injections

Insulin is an anabolic hormone. It can cause weight gain and dangerous hypoglycaemia.

E She is abusing laxatives

Laxatives cause weight loss by volume depletion. Chronic use of stimulant laxatives can lead to serious medical consequences such as fluid and electrolyte imbalance, steatorrhea, protein-losing gastroenteropathy, osteomalacia and vitamin and mineral deficiencies.

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A 19-year-old woman is referred to the clinic for review by her GP. She has been worried as she has suffered weight gain of 3 kg over the past 3 months and has not had a period for the past 2 months. There is also some breast tenderness and a feeling of fullness. On examination she looks well and has a normal BP of 125/75 mmHg; other features are entirely normal.

Investigations:

Hb	12.1 g/dl
WCC	5.6 x10^9/l
PLT	192 x10^9/l
Na$^+$	140 mmol/l
K$^+$	4.7 mmol/l
Creatinine	100 µmol/l
Prolactin	1600 mU/l (<360)

Which of the following is the most likely diagnosis?

A	Hypothyroidism
B	Pregnancy
C	Microprolactinoma
D	Macroprolactinoma
E	Polycystic ovarian syndrome

Pastest

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E Polycystic ovarian syndrome

Explanation

B Pregnancy

Prolactin levels rise rapidly in pregnancy, and the symptoms of amenorrhoea, breast fullness/tenderness and weight gain fit very well with this underlying diagnosis. A urine pregnancy test is easily accessible, and should represent the investigation of choice for this patient.

A Hypothyroidism

Hypothyroidism presents with menorrhagia and weight gain rather than the picture seen here.

C Microprolactinoma

Prolactin levels in microprolactinoma are usually slightly higher than those seen here.

D Macroprolactinoma

In macroprolactinoma a much greater rise in prolactin would be expected, with symptoms of optic chiasm compression.

E Polycystic ovarian syndrome

PCOS is associated with weight gain, irregular heavy periods and symptoms of hyperandrogenism.

Rate this question:

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A 53-year-old man with type 2 diabetes attends the clinic for review. He has had diabetes for 5 years and is currently managed with metformin 1 g PO BD and pioglitazone 30 mg daily. You understand that he suffered a myocardial infarction while on holiday some 5 months earlier and has suffered very minor episodes of angina since. He is treated with atorvastatin 40 mg, aspirin 75 mg, ramipril 10 mg and GTN PRN, and most recently has had trouble with increasing shortness of breath and peripheral oedema. His BP is 142/80 mmHg, his BMI is 29.

Investigations:

Hb	13.4 g/dl
WCC	5.6 $\times 10^9$/l
PLT	299 $\times 10^9$/l
Na^+	140 mmol/l
K^+	4.9 mmol/l
Creatinine	120 µmol/l
HbA1c	57.38 mmol/mol (7.4%)

Which of the following represent the most appropriate management in this case?

A Leave the diabetes therapy unchanged

B Add a sulphonylurea to the regime

C Change the pioglitazone to empagliflozin

D Switch to basal bolus insulin therapy

E Add liraglutide

Question 47 of 212

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A	Leave the diabetes therapy unchanged
B	Add a sulphonylurea to the regime
C	Change the pioglitazone to empagliflozin

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C Change the pioglitazone to empagliflozin

This man has a history of ischaemic heart disease and evidence of heart failure. As such, a glitazone is likely to be dangerous with respect to the possibility of worsening his heart failure and increasing the risk of cardiovascular events. For these reasons the pioglitazone should be discontinued. Because his HbA1c is only modestly elevated, a trial of SGLT-2 inhibitor is reasonable, which will control HbA1c and promote modest weight loss, accompanied by a mild diuresis. The class has also now been shown to reduce heart failure, with empagliflozin also having a positive impact on MACE events.

A Leave the diabetes therapy unchanged

Leaving therapy unchanged runs the risk of worsening heart failure and fluid retention because of the pioglitazone.

B Add a sulphonylurea to the regime

Adding a sulphonylurea risks increasing the risk of hypoglycaemia for this patient, driving weight gain, and it is not associated with positive cardiovascular outcomes.

D Switch to basal bolus insulin therapy

Switching to basal bolus insulin therapy may drive tighter glycaemic control, but it also drives hypoglycaemia and weight gain and may increase the risk of sudden cardiac death because of episodes of severe hypo.

E Add liraglutide

Without stopping the pioglitazone, it's inappropriate to move straight to adding a GLP-1 agonist.

A 28-year-old woman presents to the Endocrinology Clinic with tiredness and loss of libido. This is leading to problems with her relationship. She has had no periods for the past 4 months and has taken three pregnancy tests, all of which have been negative. She takes no medication and currently works as a solicitor. There is a past history of a left lower limb deep vein thrombosis (DVT) 5 years earlier after a return flight to the UK from Australia. She does not have any current plans for pregnancy.

On examination, her BP is 122/70 mmHg, with pulse 70/min and regular. Her BMI is 22. Visual fields are normal.

Investigations:

Hb	13.0 g/dl
WCC	7.0 × 10^9/l
PLT	201 × 10^9/l
Na^+	137 mmol/l
K^+	3.9 mmol/l
Creatinine	115 µmol/l
Prolactin	1500 U/l
Pituitary MRI	Micro-adenoma

Which of the following is the optimal way to manage her?

A Trans-sphenoidal resection

B Cabergoline

C Bromocriptine

D Domperidone

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Na^+	137 mmol/l
K^+	3.9 mmol/l
Creatinine	115 µmol/l
Prolactin	1500 U/l
Pituitary MRI	Micro-adenoma

Which of the following is the optimal way to manage her?

A	Trans-sphenoidal resection
B	Cabergoline
C	Bromocriptine
D	Domperidone
E	Combined oral contraceptive pill

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WCC	7.0 × 10⁹/l
PLT	201 × 10⁹/l
Na^+	137 mmol/l
K^+	3.9 mmol/l
Creatinine	115 µmol/l
Prolactin	1500 U/l
Pituitary MRI	Micro-adenoma

Which of the following is the optimal way to manage her?

Your answer was correct

A Trans-sphenoidal resection

B Cabergoline

C Bromocriptine

D Domperidone

E Combined oral contraceptive pill

Explanation

B Cabergoline

Dopamine agonists are the intervention of choice for microprolactinoma. A meta-analysis suggested that cabergoline is more efficacious than bromocriptine in normalising prolactin, with a better side effect profile, and it is therefore the treatment of choice for this patient.

Explanation

B Cabergoline

Dopamine agonists are the intervention of choice for microprolactinoma. A meta-analysis suggested that cabergoline is more efficacious than bromocriptine in normalising prolactin, with a better side effect profile, and it is therefore the treatment of choice for this patient.

A Trans-sphenoidal resection

Surgery is not indicated for microprolactinoma unless there is a failure of symptoms to respond to medical intervention or there is significant optic chiasm compression from a macro-adenoma.

C Bromocriptine

Bromocriptine has a slightly less favourable adverse event profile versus cabergoline, but greater evidence exists for safe use in early pregnancy. It is therefore the preferred option in women who are considering starting a family.

D Domperidone

Domperidone is a dopamine antagonist, which is a cause of hyperprolactinaemia.

E Combined oral contraceptive pill

Combined oral contraceptives are an option for women with a microprolactinoma who don't require the return of fertility, although in this case they are best avoided with the previous history of deep vein thrombosis.

A 19-year-old medical student, who is excessively tall, comes to the clinic for review. Apparently his parents are also tall. On examination he is 197 cm in height, his mother is 191 cm, his father 195 cm. His limbs look long for his body, and he has mild pectus excavatum. He has hypermobility of his finger joints. There is a systolic murmur loudest in the mitral area.

Investigations:

Hb	14.1 g/dl
WCC	5.1 x10^9/l
PLT	230 x10^9/l
Na^+	139 mmol/l
K^+	4.5 mmol/l
Creatinine	120 µmol/l
Growth hormone	5 mcg/l (0-10)
Testosterone	21 nmol/l (9-35)

Which of the following is the most likely diagnosis?

A Familial tall stature

B Homocystinuria

C Gigantism

D Klinefelter's syndrome

E Marfan's syndrome

Explanation

E Marfan's syndrome

This patient has long limbs for his height, pectus excavatum, hypermobility and a systolic murmur consistent with mitral valve prolapse, all of these features being consistent with Marfan. Unfortunately DNA testing for fibrillin gene mutations, whilst helpful, cannot exclude a diagnosis of Marfan because a number of mutations exist (at least 130). Hence diagnosis is made on the major and minor features associated with the syndrome.

A Familial tall stature

Given his long limb length, pectus excavatum, hypermobility and cardiac murmur, Marfan is a much more likely diagnosis.

B Homocystinuria

Homocystinuria has similar features to Marfan, but is often also associated with developmental delay, behavioural problems and venous thromboembolism.

C Gigantism

Although growth hormone release is episodic, and a normal level therefore doesn't totally rule out gigantism, it is less likely given the other features seen here.

D Klinefelter's syndrome

Testosterone is well within the normal range, excluding Klinefelter, where testosterone is of course expected to be low.

A 28-year-old woman presents to the Endocrinology Clinic for review. She recently suffered a fall whilst at a nightclub and was knocked out for a few minutes.

Since then, over the past few weeks, she has suffered polyuria and polydipsia. She has no past medical history of note, and her only medication is the oral contraceptive pill.

On examination, her BP is 122/72 mmHg, with pulse 85/min and regular. She has a postural drop of 15 mmHg on standing. Her BMI is 21. Neurological assessment is unremarkable.

Investigations:

Hb	13.1 g/dl
WCC	8.1×10^9/l
PLT	191×10^9/l
Na^+	143 mmol/l
K^+	4.4 mmol/l
Creatinine	142 μmol/l
Urea	9.1 mmol/l
Glucose	5.4 mmol/l
Ca^{++}	2.21 mmol/l

Which of the following is the most appropriate next investigation?

A Computerised tomography (CT) head

B Urine and plasma osmolality

C Thyroid function

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Urea	9.1 mmol/l
Glucose	5.4 mmol/l
Ca^{++}	2.21 mmol/l

Which of the following is the most appropriate next investigation?

Your answer was correct

A Computerised tomography (CT) head

B Urine and plasma osmolality

B	Urine and plasma osmolality

The diagnosis to exclude is diabetes insipidus (DI) due to the head injury, and urine and plasma osmolality is an appropriate non-invasive first step in excluding DI. Inappropriately low urine osmolality in the presence of a raised plasma osmolality is suggestive of the diagnosis, and a water deprivation test would be the obvious next step after this.

A	Computerised tomography (CT) head

In the absence of focal neurology, a CT head isn't indicated before further biochemistry is obtained.

C	Thyroid function

The lack of signs of hypo- or hyperthyroidism implies that thyroid function testing is most likely to be normal.

D	Urinary sodium

Urinary sodium is more useful in the assessment of syndrome of inappropriate antidiuretic hormone secretion (SIADH) and of acute tubular necrosis.

E	Water deprivation test

A water deprivation test is the default next investigation after a spot urine and plasma osmolality.

A 16-year-old girl who is 1.95 m in height comes to the clinic with her parents because they are concerned that she is excessively tall. She entered puberty normally at the age of 13 years, and takes no regular medication. She is achieving at school and is on course for 10 GCSEs.

Her BP is 105/60 mmHg and she has a diastolic murmur loudest in the aortic area. She displays dolichostenomelia and arachnodactyly. Her BMI is 21. Secondary sexual development appears normal.

Which of the following is the most likely diagnosis?

A	Acromegaly
B	Ehler's Danlos syndrome
C	Homocystinuria
D	Marfan's disease
E	Turner's syndrome

Explanation

D	Marfan's disease

Marfan may present as a spontaneous mutation (1/3 of cases), and this occurs more commonly to offspring of older males. The body habitus is typical for Marfan, and the murmur is consistent with aortic valve disease seen in that condition. Of key importance is the control of blood pressure to prevent progression to aortic dissection, as such patients are treated with prophylactic beta blockade or ACE inhibition. Lens dislocation is common, as are periodontic disease and joint dislocations. Pregnancy is thought to be associated with a significantly increased risk of aortic rupture, and specialist input in management is therefore recommended.

A	Acromegaly

Acromegaly is associated with other features such as increase in the size of the lower jaw or fingers, soft tissue swelling, hypertension and diabetes, none of which are seen here.

B	Ehler's Danlos syndrome

Although Ehlers Danlos, like Marfan, is associated with hypermobility, it is also, however, associated with normal adult height.

C	Homocystinuria

Although the presentation of homocystinuria is similar to that of Marfan, the condition is usually associated with learning difficulties.

A 44-year-old woman comes to the clinic complaining of shortness of breath and a choking sensation, particularly when she goes to bed. She has seen the GP, been given a diagnosis of anxiety and started on sertraline. On examination she has an obvious multinodular goitre.

Investigations:

Hb	12.7 g/dl
WCC	5.9 x10^9/l
PLT	194 x109/l
Na$^+$	139 mmol/l
K$^+$	4.9 mmol/l
Creatinine	100 µmol/l
TSH	3.5 U/l (<0.5-4.5)
Ultrasound	Multiple thyroid nodules, very large goitre

Which of the following is the most appropriate therapy?

A	Radioiodine
B	Carbimazole
C	Propylthiouracil
D	Observation
E	Sub-total thyroidectomy

E Sub-total thyroidectomy

The fact this woman has symptoms of thoracic inlet obstruction when she lies flat in bed raises the possibility that she may have significant tracheal compression because of her goitre. There is some debate about whether sub-total or total thyroidectomy is the most appropriate option, with slow re-growth and the possibility of malignant change favouring the latter, but this is countered with increased potential risk of postoperative hypoparathyroidism and recurrent laryngeal nerve palsy.

A Radioiodine

Radioiodine is not warranted in a patient who is euthyroid; it is effective in patients with thyrotoxicosis where increased uptake of iodine is seen.

B Carbimazole

Anti-thyroid drugs will result in hypothyroidism without resolving the goitre seen here.

C Propylthiouracil

Like carbimazole, propylthiouracil will result in hypothyroidism without significant resolution of the goitre.

D Observation

This woman has significant symptoms of thoracic outlet obstruction and is at risk of nocturnal hypoxia.

A 68-year-old woman who has been taking long term amiodarone therapy comes to the clinic complaining of palpitations at rest. On examination her BP is 135/75 mmHg, her pulse is 90/min at rest. Thyroid gland examination is normal.

Investigations;

Hb	11.9 g/dl
WCC	6.1 $\times 10^9$/l
PLT	182 $\times 10^9$/l
Na^+	138 mmol/l
K^+	4.9 mmol/l
Creatinine	130 µmol/l
TSH	<0.05 U/l (<0.5-4.5)
Thyroid autoantibodies	-ve
IL-6	Elevated

You change her amiodarone for another agent. Which of the following is the mainstay of therapy in this situation?

A	Carbimazole
B	Potassium perchlorate
C	Thyroidectomy
D	Corticosteroids
E	Propylthiouracil

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WCC	6.1 x10⁹/l
PLT	182 x10⁹/l
Na⁺	138 mmol/l
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TSH	<0.05 U/l (<0.5-4.5)
Thyroid autoantibodies	-ve
IL-6	Elevated

You change her amiodarone for another agent. Which of the following is the mainstay of therapy in this situation?

Your answer was correct

A	Carbimazole
B	Potassium perchlorate
C	Thyroidectomy
D	Corticosteroids
E	Propylthiouracil

Explanation

D Corticosteroids

This patient has amiodarone-induced thyrotoxicosis (AIT) type 2, as evidenced by the relatively normal thyroid on clinical examination, lack of marked signs of thyrotoxicosis, elevated IL-6 and negative thyroid autoantibodies. Management of AIT type 2 is very different to the management of AIT type 1, with corticosteroids being the mainstay of therapy. This is because AIT type 2 is the result of a direct effect of amiodarone, which leads to thyroiditis.

A Carbimazole

Anti-thyroid drugs are the mainstay of therapy for AIT type 1, which is more usually associated with positive thyroid antibodies and there is no rise in IL-6. There is no practical difference in efficacy between propylthiouracil and carbimazole.

B Potassium perchlorate

Potassium perchlorate is utilised to gain acute control of thyroid function in patients who require urgent intervention, for example because of unstable cardiovascular disease.

C Thyroidectomy

This is considered for patients who fail to respond to medical intervention alone, usually for AIT type 1.

E Propylthiouracil

This is an alternative to carbimazole as a mainstay of intervention in AIT type 1.

A 27-year-old woman attends the GP 3 months after the birth of her second child. She complains of an increasing inability to cope over the past few months and frequent tearfulness.

On examination, her BP is 132/72 mmHg, her pulse is 66/min and regular, her BMI is 28 and she tells you she has gained weight over the past 2-3 weeks.

Investigations:

TSH	8.5 mU/l (0.4-5.0)
Free T4	6.5 pmol/l (10-22)
Anti TPO antibodies	+

Which of the following diagnoses fits best with this clinical picture?

A	Grave's disease
B	Hashimoto's thyroiditis
C	Post-partum thyroiditis
D	Sub-acute thyroiditis
E	Riedel's thyroiditis

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C Post-partum thyroiditis

Postpartum thyroiditis is said to develop some 3-7 months after pregnancy and is often associated with mild symptoms such as tiredness or depression. It is said to occur to varying degrees in 5-7% of women, and in 30-52% of cases anti-TPO antibodies are positive. Permanent hypothyroidism is said to develop in around 40% of patients, with increased frequency in patients with positive anti-TPO antibodies. Standard treatment for postpartum hypothyroidism is low-dose thyroxine (around 50 µg), with a withdrawal period after 6 months to measure recovery of thyroid function.

A Grave's disease

Graves' disease is associated with thyrotoxicosis rather than the picture of hypothyroidism seen here.

B Hashimoto's thyroiditis

This is the major differential, but the timing of her symptoms means that postpartum thyroiditis is potentially more likely, and there is potential to recover from the hypothyroidism seen here.

D Sub-acute thyroiditis

Subacute thyroiditis is associated with flu-like symptoms and pain over the thyroid gland rather than the picture seen here.

E Riedel's thyroiditis

This is associated with dense fibrosis of the thyroid gland and notable changes in the anterior neck, not seen in this patient, and not associated with the post-pregnancy

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A 27-year-old woman who is 22 weeks' pregnant with her second child comes to the clinic complaining of anxiety and palpitations. She is concerned as she is finding it difficult to maintain an adequate weight. On examination she has a BP of 135/70 mmHg and a resting pulse of 88/min. You palpate a nodule on the left hand side of her thyroid.

Investigations:

Hb	11.4 g/dl
WCC	5.9 $\times 10^9$/l
PLT	172 $\times 10^9$/l
Na^+	141 mmol/l
K^+	4.0 mmol/l
Creatinine	95 µmol/l
TSH	<0.05 (<0.5-4.5)
Free T4	31 pmol/l (10-22)
Ultrasound	solitary left sided thyroid nodule

FNA reveals an adenoma.

Which of the following is the most appropriate management for her?

A Subtotal thyroidectomy

B Propanolol

C Radioiodine

D Anti-thyroid medication

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Ultrasound	solitary left sided thyroid nodule

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Which of the following is the most appropriate management for her?

A	Subtotal thyroidectomy
B	Propanolol
C	Radioiodine
D	Anti-thyroid medication
E	Lugol's iodine

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D	Anti-thyroid medication

In this scenario, options are limited to manage her thyrotoxicosis. Anti-thyroid drugs would form the mainstay of intervention until after delivery. Both propylthiouracil and carbimazole are options, although the former is not recommended in late pregnancy because of the risk of maternal liver dysfunction.

A	Subtotal thyroidectomy

This is the option for patients who are unable to tolerate anti-thyroid medication.

B	Propanolol

Propanolol offers symptomatic relief only, and will not reduce the risk of fetal loss due to thyrotoxicosis.

C	Radioiodine

Radioiodine is contraindicated during pregnancy, and is likely to be unsuitable for this patient for a considerable period of time because of the need to avoid exposure to young children.

E	Lugol's iodine

Lugol's iodine is used to acutely control thyrotoxicosis when urgent surgery is considered.

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A 32-year-old woman is referred to the clinic by the Emergency Department. She has had three episodes of collapse over the past 5 months. There is also a history of increased hunger, which has been accompanied by gradual weight gain.

On further questioning, family history reveals no useful information. You elect to admit her for a period of fasting. The morning after admission, after some 16 h without food, she complains of feeling faint.

Investigations:

Glucose	2.1 mmol/l
Insulin	7 mU/l with increased proportion of pro-insulin
C-peptide	Elevated
Cortisol	550 nmol/l

Which of the following diagnoses fits best with this clinical picture?

A Abuse of insulin secretagogues

B Abuse of insulin

C Insulinoma

D Glucagonoma

E Addison's disease

C Insulinoma

After a 15 h fast, the cut-off normal limits for glucose are 2.5 mmol/l and 5 mU/l for insulin. As such, this patient has an inappropriately low glucose and raised insulin level. By 24 h, fasting leads to a detection rate of 78% for insulinoma. If the fast is extended to 72 h, this detection rate increases to 98%. Insulinomas have an incidence of 1-2/million/year, are commoner in women and may be associated with the MEN-1 syndrome in around 10%; 90% of them are less than 2 cm in size. More of the insulin released by an insulinoma remains as pro-insulin, so that pro-insulin levels are often raised as a proportion of total insulin levels.

A Abuse of insulin secretagogues

As she is in hospital, abuse of insulin secretagogues is unlikely.

B Abuse of insulin

Abuse of insulin would lead to raised insulin levels without a corresponding rise in c-peptide.

D Glucagonoma

A glucagonoma would lead to hyperglycaemia, rather than hypoglycaemia.

E Addison's disease

The cortisol levels in this patient are appropriately towards the upper end of the normal range, making Addison's disease very unlikely.

A 42-year-old man presents to the Emergency Department with loss of vision in his right eye. Past history of note includes recurrent episodes of acute pancreatitis. Fundoscopy reveals cotton wool spots and a number of flame haemorrhages. On wider examination there is evidence of eruptive xanthoma on extensor surfaces of upper and lower limbs. Emergency blood testing reveals normal full blood count and U&E, but the lab notes that the sample appears markedly lipaemic. Previous blood lipid results are not available.

Which of the following represents the best long-term management for this patient?

A Warfarin

B Clopidogrel

C Aspirin

D Fenofibrate

E Simvastatin

A 42-year-old man presents to the Emergency Department with loss of vision in his right eye. Past history of note includes recurrent episodes of acute pancreatitis. Fundoscopy reveals cotton wool spots and a number of flame haemorrhages. On wider examination there is evidence of eruptive xanthoma on extensor surfaces of upper and lower limbs. Emergency blood testing reveals normal full blood count and U&E, but the lab notes that the sample appears markedly lipaemic. Previous blood lipid results are not available.

Which of the following represents the best long-term management for this patient?

Your answer was correct

A	Warfarin
B	Clopidogrel
C	Aspirin
D	Fenofibrate
E	Simvastatin

Explanation

D Fenofibrate

This patient has presented with retinal vein thrombosis and has a past history of recurrent pancreatitis. Together with the clinical findings of eruptive xanthomata and the

D Fenofibrate

This patient has presented with retinal vein thrombosis and has a past history of recurrent pancreatitis. Together with the clinical findings of eruptive xanthomata and the lipaemic sample on testing in the Emergency Department, this picture is highly suggestive of familial hypertriglyceridaemia. The mainstay of management is commencement of fibrate therapy.

A Warfarin

The venous thrombosis is related to hypertriglyceridaemia and is not a result of a coagulation disorder for which antithrombotics are indicated.

B Clopidogrel

Clopidogrel is an antiplatelet agent, the primary role of which is in stroke secondary prevention, post coronary artery stenting, and in patients who are intolerant to aspirin.

C Aspirin

Aspirin is indicated for secondary prevention of coronary artery disease and in primary stroke prevention.

E Simvastatin

Statins including simvastatin have only modest effects on triglycerides and as such are not indicated here.

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A 26-year-old dancer is referred by her dentist since he was concerned about the erosion of enamel on her teeth. The patient herself reports no health problems, and feels generally fit and well, admitting to exercising for 3 hours every day. However, examination of the patient shows her to be thin and she is found to weigh 48 kg but is 1.7 m tall. Routine laboratory investigations are performed and hypokalaemia is noted.

Which of the following would be the most appropriate investigation?

- A Bartter's syndrome genetic testing
- B Magnesium levels
- C Carry out an initial screen for eating disorders
- D 24-hour urinary catecholamines
- E 24-hour urinary 5HIAA

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Your answer was correct

A	Bartter's syndrome genetic testing
B	Magnesium levels
C	Carry out an initial screen for eating disorders
D	24-hour urinary catecholamines
E	24-hour urinary 5HIAA

Explanation

C Carry out an initial screen for eating disorders

Anorexia nervosa is an eating disorder characterised by severe weight loss leading to significant physiological consequences – affected patients starve themselves into an emaciated state yet continue to convince themselves that they are overweight. It is a condition that predominantly

C	Carry out an initial screen for eating disorders

Anorexia nervosa is an eating disorder characterised by severe weight loss leading to significant physiological consequences – affected patients starve themselves into an emaciated state yet continue to convince themselves that they are overweight. It is a condition that predominantly affects young women (M:F ratio 1:50) especially in industrialised countries where cultural pressures encourage a woman to be thin. Use of laxatives to drive weight loss is common.

An initial screen for eating disorders, and a referral to an eating disorder service if appropriate, would be the most appropriate next step.

A	Bartter's syndrome genetic testing

Although hypokalaemia is reported here, the more likely cause is purgative abuse rather than Bartter's syndrome.

B	Magnesium levels

Hypomagnesaemia may be present as a result of purgative abuse, although it does not reveal the likely underlying cause.

D	24-hour urinary catecholamines

24-hour urinary catecholamines are used as the screen for phaeochromocytoma, and apart from hypokalaemia there are no other pointers to a phaeochromocytoma.

E 24-hour urinary 5HIAA

A 40-year-old solicitor who is attending the Hypertension Clinic describes a 3-month-history of episodes of headaches and dizziness. In addition he often experiences vague central abdominal discomfort. He feels that he has lost some weight recently, though this may be related to a low-fat diet he has been trying. Examination shows a standing BP of 152/90 mmHg. In addition there appears to be a thyroid swelling which has not previously been noted. His bone profile revealed a corrected calcium of 2.74 mmol/l. He also had an oral glucose tolerance test with his GP, who was concerned about the weight loss, which was normal, hence excluding the diagnosis of diabetes.

Which one of the following is most likely to be the cause of his hypertension?

A Cushing's syndrome

B Addison's disease

C Abuse of growth hormone

D Phaeochromocytoma

E Graves' disease

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A	Cushing's syndrome
B	Addison's disease
C	Abuse of growth hormone
D	Phaeochromocytoma
E	Graves' disease

Explanation

D Phaeochromocytoma

The episodic symptoms of headache and dizziness, the hypertension, the hypercalacaemia and the thyroid mass fit better with a phaeochromocytoma in the context of MEN 2A. MEN 2 presents with medullary thyroid carcinoma and

D Phaeochromocytoma

The episodic symptoms of headache and dizziness, the hypertension, the hypercalacaemia and the thyroid mass fit better with a phaeochromocytoma in the context of MEN 2A. MEN 2 presents with medullary thyroid carcinoma and phaechromocytoma. The third component could be parathyroid hyperplasia (MEN 2A) or mucutaneous neuromas and marfanoid habitus (MEN 2B).

A Cushing's syndrome

Cushing syndrome is a cause of secondary hypertension but would not cause weight loss. The typical feature is weight gain with central distribution.

B Addison's disease

Addison's could be considered in the context of dizziness and abdominal pain, but hypertension would be unusual in this condition. It mainly resents with postural hypotension, nausea, abdominal pain and hyperpigmentation.

C Abuse of growth hormone

Abuse of growth hormone is another cause for secondary hypertension. It may also lead to weight gain, insulin resistance and impaired glucose tolerance, which is not the case in this scenario.

E Graves' disease

Graves' disease can cause a diffusely enlarged, non-tender goitre and also mild hypercalcaemia in the acute phase (thyrotoxicosis). However, dizziness, abdominal pain and hypertension are not features of the condition.

An 63-year-old visitor from Saudi Arabia attends the clinic with her son after referral from her general practitioner (GP). He has noticed that she has symptoms of hypercalcaemia, and is worried about hyperparathyroidism.

On further questioning, you find out she has been taking Rennie anti-indigestion tablets three or four times per day, and has increased these as she has felt progressively more nauseous. Additionally, she is taking a calcium supplement to guard against bone fracture as her mother suffered from fractures late in life. Additional symptoms include fatigue, and apparently while in Saudi Arabia she was started on sertraline for depression.

Investigations:

Hb	12.9 g/dl
WCC	5.6 × 10^9/l
PLT	145 × 10^9/l
ESR	18 mm/hr
Na^+	140 mmol/l
K^+	5.0 mmol/l
Creatinine	185 µmol/l
Ca^{++}	2.85 mmol/l
PTH	low
CXR	No focal lesion seen

Which of the following is the most likely diagnosis?

A Familial hypercalcaemic hypocalciuria

B Hypoparathyroidism

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Investigations:

Hb	12.9 g/dl
WCC	5.6 × 10^9/l
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Which of the following is the most likely diagnosis?

A	Familial hypercalcaemic hypocalciuria
B	Hypoparathyroidism
C	Primary hyperparathyroidism
D	Hypercalcaemia of malignancy
E	Milk-alkali syndrome

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Explanation

E Milk-alkali syndrome

This patient has a markedly elevated oral calcium intake, as illustrated by her propensity to take both calcium-containing indigestion medications (Rennies is a mixture of calcium and magnesium carbonate) and calcium supplementation to reduce the risk of bone fracture. Additionally, she has various symptoms of hypercalcaemia including the nausea, lethargy and depression reported here. The condition can lead to mild renal impairment, as we've seen with her elevated serum creatinine, but this may well return to normal once calcium intake is reduced.

A Familial hypercalcaemic hypocalciuria

FHH is usually asymptomatic, although some patients may present with renal stones, or very rarely with acute pancreatitis.

B Hypoparathyroidism

Hypoparathyroidism is associated with hypocalcaemia rather than the elevated calcium seen here.

C Primary hyperparathyroidism

In the absence of the strong history of excess calcium and alkali ingestion here, primary hyperparathyroidism would be considered the main differential, although a normal or slightly elevated PTH, rather than the low value seen here would be expected.

D Hypercalcaemia of malignancy

Hypercalcaemia of malignancy is a possibility given the

present with renal stones, or very rarely with acute pancreatitis.

B Hypoparathyroidism

Hypoparathyroidism is associated with hypocalcaemia rather than the elevated calcium seen here.

C Primary hyperparathyroidism

In the absence of the strong history of excess calcium and alkali ingestion here, primary hyperparathyroidism would be considered the main differential, although a normal or slightly elevated PTH, rather than the low value seen here would be expected.

D Hypercalcaemia of malignancy

Hypercalcaemia of malignancy is a possibility given the patient's age, but the lack of other symptoms, apart from indigestion, and relatively normal blood picture including ESR and haemoglobin, count against this.

A 42-year-old woman is admitted to hospital with central chest pain suspicious of angina. She has a history of resistant hypertension, currently managed by her GP with Ramipril, amlodipine and indapamide. She tells you that her mother suffered from Conn syndrome and she is concerned she may have the same problem. Her BP is 155/95, pulse is 84 and regular. Her BMI is 22.

What abnormality would you expect to find in the patient's workup if she was suffering from Conn syndrome?

A Hyponatraemia

B Elevated serum creatinine

C Metabolic acidosis

D Hypokalaemia

E Hypernatraemia

C Metabolic acidosis

D Hypokalaemia

E Hypernatraemia

Explanation

D Hypokalaemia

Conn syndrome, a cause of secondary hypertension, is usually due to an aldosterone-secreting adenoma which leads to hyporeninaemic hyperaldosteronism. The rule of thumb is that in patients prescribed an ACE inhibitor, hypokalaemia is highly suggestive of the condition. It was previously thought that adrenal adenomas were responsible for the majority of cases of hyporeninaemic hyperaldosteronism, but it's now realised that the split is much more 50:50. Aldosterone has an action on the distal tubule of the kidney to increase sodium resorption and enhance potassium and hydrogen ion loss. Renin levels are suppressed and do not rise with an upright posture. Medical treatment includes a low-sodium diet with an aldosterone receptor antagonist (spironolactone). Surgical therapy is usually indicated after localisation of adenoma.

A Hyponatraemia

Hyponatraemia is associated with adrenal insufficiency, not with hyporeninaemic hyperaldosteronism.

B Elevated serum creatinine

This patient may yet develop intrinsic renal damage as a

Explanation

D Hypokalaemia

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Hyponatraemia is associated with adrenal insufficiency, not with hyporeninaemic hyperaldosteronism.

B Elevated serum creatinine

This patient may yet develop intrinsic renal damage as a result of chronic hypertension, and thus creatinine values may well be normal.

C Metabolic acidosis

Mineralocorticoid excess leads to presentation with elevated bicarbonate and a metabolic alkalosis, not acidosis.

E Hypernatraemia

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This patient may yet develop intrinsic renal damage as a result of chronic hypertension, and thus creatinine values may well be normal.

C	Metabolic acidosis

Mineralocorticoid excess leads to presentation with elevated bicarbonate and a metabolic alkalosis, not acidosis.

E	Hypernatraemia

Although serum sodium may well be at the upper end of the normal range, frank hypernatraemia is often not seen in patients with Conn syndrome.

A 38-year-old woman presents with decreased libido, vaginal dryness and absence of periods for the past 4 months.

Most recently, she has begun to suffer embarrassing milk leakage from her breasts on only minor nipple stimulation. Medication history includes use of the oral contraceptive pill. Prolactin level is 1300 IU and she maintains that she could not possibly be pregnant as she has bought a home test, which is negative.

Her BP is normal at 132/72 mmHg, pulse is 74/min and regular and her BMI is 23.

Which of the following is most likely to yield the diagnosis?

A	Magnetic resonance imaging (MRI) scan of the pituitary fossa
B	Laboratory pregnancy test
C	Thyroid function testing
D	Abdominal ultrasound scan
E	Gonadotropin-releasing hormone (GnRH) testing

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Explanation

A Magnetic resonance imaging (MRI) scan of the pituitary fossa

A Magnetic resonance imaging (MRI) scan of the pituitary fossa

Prolactin levels are too elevated to be due to the oral contraceptive pill; with this symptomatic picture it is important to rule out a prolactinoma or other pituitary tumour leading to raised prolactin levels due to pressure effects. MRI scanning is needed to determine tumour size and location. Given her prolactin level, the most likely diagnosis is a micro-adenoma producing prolactin; as such, the management of choice is with a dopamine agonist such as bromocriptine or cabergoline in the first instance.

B Laboratory pregnancy test

Shop-bought pregnancy tests have an accuracy of above 95%, so pregnancy is unlikely; however, it would be reasonable to perform a re-test to make absolutely sure that it is negative.

C Thyroid function testing

Given that there has been no weight loss or other symptoms of thyrotoxicosis, hyperthyroidism as a cause of her amenorrhoea is unlikely. Additionally, it is hypothyroidism rather than thyrotoxicosis that is associated with elevated prolactin levels.

D Abdominal ultrasound scan

Elevated prolactin levels are noted in some ovarian and endometrial cancers and with pregnancy, although these are unlikely diagnoses given the absence of abdominal symptoms and negative pregnancy test.

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E Gonadotropin-releasing hormone (GnRH) testing

This is used in the work-up primarily of precocious and delayed puberty associated with low LH and FSH levels.

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A 45-year-old woman was referred by her general practitioner (GP) for the management of her type 2 diabetes mellitus and persistent hypertension. In addition to insulin and metformin for her diabetes, she was also on sertraline and lorazepam for her depression, and carbamazepine for her agonizing post-herpetic neuralgia.

On examination, she was obese with a round face and moderate facial acne. She was a heavy drinker. An overnight dexamethasone suppression test showed failure of suppression of cortisol. A provisional diagnosis of Cushing syndrome was made. However, computed tomography (CT) of the chest and abdomen revealed normal adrenal glands and no evidence of malignancy, and the serum cortisol measurement showed normal daily variation. Further investigations including a midnight cortisol later excluded Cushing syndrome.

What was the reason for her failed initial dexamethasone suppression test?

A	Interference of metformin with the cortisol radioimmunoassay
B	Variance of baseline cortisol due to fluctuating glycaemic control
C	The induction of the cytochrome p450 system by alcohol and carbamazepine
D	Fluctuating level of adrenocorticotropic hormone (ACTH) and cortisol due to non-compliance with insulin treatment
E	Ectopic ACTH production

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C The induction of the cytochrome p450 system by alcohol and carbamazepine

The overnight dexamethasone suppression test is usually used as a screening test for Cushing syndrome. This test has a false-positive rate of up to 2-12% (meaning that a diagnosis of Cushing is suggested incorrectly). Dexamethasone is primarily metabolised by the cytochrome p450 system, specifically by the CYP3A4 isoenzyme. Several drugs such as phenobarbital, carbamazepine and rifampicin are enzyme inducers, and therefore lead to increased activity of CYP3A4 enzyme, and can thus result in false-positive dexamethasone suppression tests. Considerable increases in cytochrome 450 enzyme activity can be seen in smokers and people who drink alcohol regularly.

D Fluctuating level of adrenocorticotropic hormone (ACTH) and cortisol due to non-compliance with insulin treatment

Non-compliance with insulin treatment is likely to lead to poor glycaemic control, but there is not known to be a link between this and levels of ACTH or cortisol.

A Interference of metformin with the cortisol radioimmunoassay

Patients need to be off all oestrogen-containing medication for six weeks prior to any measurements of serum cortisol, but metformin is not known to effect cortisol.

B Variance of baseline cortisol due to fluctuating glycaemic control

Whilst patients with diabetes often have slightly higher

Rana Alnasser's screen

ere is no link between raised

tumour, and we are given no suggestion in the history of one here. Very high ACTH levels are highly suggestive of an ectopic source of ACTH.

A high-dose dexamethasone suppression test is used by some units to help differentiate between pituitary and ectopic sources of ACTH in difficult to diagnose Cushing syndrome, where ACTH fails to suppress when the production is ectopic.

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2. Meikle AW, Stanchfield JB, West CD, Tyler FH. Hydrocortisone suppression test for Cushing syndrome: therapy with anticonvulsants. *Arch Intern Med* 1974; 134: 1068–71.

Useful mnemonic

Enzyme inducers = SCRAP GP (sulphonylureas, carbamazepine, rifampicin, alcohol, phenytoin, griseofulvin, phenobartbitol)

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A 34-year-old woman presents to the Emergency Department with increasing nausea and vomiting over the past 72 h. She has a history of autoimmune hypothyroidism controlled with thyroxine replacement, but has no other significant past medical illnesses.

On further questioning, it transpires that she has lost weight and been feeling increasingly lethargic, having passed out twice at work, in the last three months.

Examination reveals a BP of 100/80 mmHg, which falls to 85/65 mmHg on standing; her pulse is 80/min and regular. She is slim and tanned with a BMI of 20.

Investigations:

Hb	11.9 g/dl
WCC	7.1×10^9/l
PLT	188×10^9/l
Na^+	130 mmol/l
K^+	4.9 mmol/l
Creatinine	110 µmol/l
Urea	10.2 mmol/l
Glucose	4.1 mmol/l
TSH	2.1 U/l

Which of the following is the most important step?

A IV hydrocortisone

B IV normal saline

C Oral fludrocortisone

D Synacthen test the following day

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Na⁺	130 mmol/l
K⁺	4.9 mmol/l
Creatinine	110 µmol/l
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Glucose	4.1 mmol/l
TSH	2.1 U/l

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E	Abdominal ultrasound scan (USS)

A IV hydrocortisone

The presentation here is consistent with Addison's disease. Given the significantly abnormal clinical chemistry, coupled with worsening nausea and vomiting, there is no opportunity to delay initiation of therapy whilst awaiting a Synacthen test. Commencing IV hydrocortisone is therefore the initial intervention of choice. In this case, given the previous history of autoimmune thyroid disease, autoimmune adrenal failure is the most likely cause here. Adrenal insufficiency is excluded in the Synacthen test by an incremental rise in cortisol of > 200 nmol/L and a 30 min value > 600 nmol/L. One dose of hydrocortisone the previous evening is unlikely to affect interpretation of the test.

B IV normal saline

Although IV normal saline may temporarily improve blood pressure, it won't impact on the underlying cause, in this case adrenal insufficiency.

C Oral fludrocortisone

Oral fludrocortisone is used in patients who fail to maintain postural blood pressure despite adequate corticosteroid replacement.

D Synacthen test the following day

Delaying intervention until after a Synacthen test is inappropriate given the significant hypotension and

E Abdominal ultrasound scan (USS)

This may reveal adrenal atrophy or calcification, but it won't provide an estimation of adrenal function.

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E Abdominal ultrasound scan (USS)

This may reveal adrenal atrophy or calcification, but it won't provide an estimation of adrenal function.

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A 51-year-old woman is brought in to the Emergency Department severely unwell, with a 3 h history of severe shortness of breath and weakness. On admission she is tachycardic and hypotensive, with a blood pressure (BP) of 80/60 mmHg. She is afebrile, and examination of her chest reveals bilateral fine crackles up to her mid-zones. During initial assessment her BP falls to 60 mmHg systolic and she is treated with inotropes. She makes a gradual recovery and an echocardiogram performed that day reveals severe cardiomyopathy with a left ventricular ejection fraction of 30%. Initial blood tests including full blood count, urea and electrolytes, troponin and liver function tests are within normal limits. On further questioning the patient admits to having had recurrent episodes of headache over the past month. She has no other significant medical or family history. During a work-up for the cause of her presentation, a computerised tomography scan (CT) of the abdomen is performed which shows a 5 cm, enhancing intra-abdominal mass close to the origin of the inferior mesenteric artery.

What is the most appropriate next step in investigation?

A	CT-guided biopsy of the abdominal lesion
B	^{131}I-metaiodobenzylguanidine (MIBG)) scan
C	24 h urinary catecholamines
D	Drug screen
E	Exercise stress test

C 24 h urinary catecholamines

Phaeochromocytoma is a rare, catecholamine-secreting tumour most commonly found in the adrenal medulla. Although the typical presentation is that of hypertension with paroxysms of headache, palpitations and sweating, it can also present with severe hypotension from catecholamine-induced cardiomyopathy, as in this case. Approximately 10% of tumours are extra-adrenal (sometimes called paragangliomas), 10% are bilateral and 10% are malignant. Phaeochromocytomas are associated with a number of syndromes, including multiple endocrine neoplasia (MEN) 2A and MEN 2B.

Diagnosis is made by demonstrating elevated catecholamine levels in a 24 h urine sample. Treatment is by surgical excision of the tumour after pharmacological alpha- and beta-adrenergic blockade.

B ^{131}I-metaiodobenzylguanidine (MIBG)) scan

A scan with ^{131}iodine-labelled metaiodobenzylguanidine (MIBG) is used in cases where a tumour is confirmed biochemically but cannot be identified on computerised tomography (CT) or magnetic resonance imaging (MRI) scanning.

A CT-guided biopsy of the abdominal lesion

The aim of the first line of investigations for an adrenal tumour is to determine whether it is functioning or not; therefore, a full hormonal profile

(adrenal androgens, renin:aldosterone ratio, urinary cathecholamines) is the first line of treatment. If the tumour proves to be functioning, then surgical resection needs to be considered. If it is a non-functioning adenoma, surveillance depending on radiological criteria (size of the tumour, consistency) is recommended.

cathecholamines) is the first line of treatment. If the tumour proves to be functioning, then surgical resection needs to be considered. If it is a non-functioning adenoma, surveillance depending on radiological criteria (size of the tumour, consistency) is recommended.

D Drug screen

In the context of the history and clinical presentation (pulmonary oedema with left ventricular failure), drug screen is not appropriate. Drug screen could be considered when cocaine ingestion may be considered in the differential - for instance, when a relatively young patient presents acutely with symptoms of heart failure that may be secondary to myocardial infarction.

E Exercise stress test

This lady has clinically symptoms and signs of heart failure confirmed by ECHO, and the priority is to treat the underlying cause (phaeochromocytoma). An exercise stress test would not add much in terms of diagnosis.

A 72-year-old woman presents with severe vomiting and dehydration. There has been a history of tiredness, weakness, malaise and weight loss which has increased over the past few months.

Other past medical history of note involves a left breast lumpectomy 6 years previously and increasing bone and joint pain over the past few years.

On examination, she looks dehydrated. Her BP is 100/60 mmHg, with a pulse of 96/min. Her BMI is 21. There is a scar over her left breast and she is tender over the lower part of her back and over her left hip.

Investigations:

Corrected Ca^+	3.6 mmol/l
Urea	15.2 mmol/l
Creatinine	286 µmol/l
Albumin	28 g/l
Hb	10.8 g/dl
Viscosity	2.8 mPa/s (1.5-1.72)
Urinalysis	Proteinuria

Which of the following is the initial management of choice in this case?

A IV normal saline

B IV 5% dextrose

C Furosemide (frusemide)

D Bendroflumethiazide

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Explanation

A IV normal saline

Initial management of choice would be fluid rehydration with normal saline, aiming for 3-6 l in 24 h depending on fluid and cardiovascular status. Rehydration can significantly reduce calcium, allowing for the impact of other interventions to take effect. Although the history of lumpectomy may be a pointer towards carcinoma of the breast, the raised viscosity and anaemia are suggestive of myeloma. It is likely that the development of renal amyloidosis secondary to the myeloma has precipitated the proteinuria seen here. Bisphosphonates are the mainstay of therapy for malignant hypercalcaemia.

B IV 5% dextrose

Hypercalcaemia is associated with relative salt and water depletion, and therefore normal saline is the default choice for initial fluid replacement.

C Furosemide (frusemide)

IV furosemide without rehydration first can drive a further increase in creatinine, and worsening pre-kidney disease.

D Bendroflumethiazide

Thiazide diuretics promote calcium retention and should therefore be avoided here.

E IV calcitonin

Although IV calcitonin is used as a treatment for acute

Question 16 of 162

A IV normal saline

Initial management of choice would be fluid rehydration with normal saline, aiming for 3-6 l in 24 h depending on fluid and cardiovascular status. Rehydration can significantly reduce calcium, allowing for the impact of other interventions to take effect. Although the history of lumpectomy may be a pointer towards carcinoma of the breast, the raised viscosity and anaemia are suggestive of myeloma. It is likely that the development of renal amyloidosis secondary to the myeloma has precipitated the proteinuria seen here. Bisphosphonates are the mainstay of therapy for malignant hypercalcaemia.

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D Bendroflumethiazide

Thiazide diuretics promote calcium retention and should therefore be avoided here.

E IV calcitonin

Although IV calcitonin is used as a treatment for acute hypercalcaemia, IV normal saline is the initial step given that the majority of patients are significantly fluid depleted at presentation.

A 49-year-old woman with a history of type 2 diabetes comes to the Diabetes Clinic for review. She has been taking metformin for the last 3 years but is gradually losing control of her blood sugars.

Her current metformin dose is 1g BD. She has a history of hypertension which is currently managed with ramipril and indapamide.

On examination, her BP is 155/85 mmHg and pulse is 67/min and regular. Her BMI is 36.

Investigations:

Hb	124 g/l
WCC	6.1×10^9 /l
PLT	203×10^9 /l
Na	138 mmol/l
K	4.5 mmol/l
Creatinine	102 µmol/l
HbA1c	62 mmol/mol (7.8%)

Which of the following is the most appropriate next step?

A	Dapagliflozin
B	Glimepiride
C	Liraglutide
D	Pioglitazone
E	Saxagliptin

A Dapagliflozin

This patient is obese and is outside the guidance for good HbA1c control set by NICE at 58mmol/mol for HbA1c; as such she requires therapy intensification. Out of the options given, the SGLT-2 inhibitor is the most appropriate option because it results in modest calorie spillage into the urine, and has positive effects on blood pressure control. Patients on average see around 2% weight loss over 6 months, although in some much greater weight reduction is seen. Evidence from cardiovascular outcomes amongst the class, (the Empa-Reg study for empagliflozin), suggests a positive impact on cardiovascular outcomes.

B Glimepiride

Sulphonylureas promote weight gain and increase the risk of hypoglycaemia, glimepiride is therefore suboptimal as a therapy option for this patient.

C Liraglutide

Although liraglutide is likely to drive greater weight loss versus SGLT-2, it is not recommended by NICE guidelines to introduce a GLP-1 at this stage.

D Pioglitazone

Glitazones promote weight gain, fluid retention and over the longer term have a negative impact on bone mineral density. They are therefore best avoided in a relatively young, obese woman.

E Saxagliptin

DPPIV inhibitors are a possible option after metformin, and do not increase the risk of hypoglycaemia. SGLT-2

C Liraglutide

Although liraglutide is likely to drive greater weight loss versus SGLT-2, it is not recommended by NICE guidelines to introduce a GLP-1 at this stage.

D Pioglitazone

Glitazones promote weight gain, fluid retention and over the longer term have a negative impact on bone mineral density. They are therefore best avoided in a relatively young, obese woman.

E Saxagliptin

DPPIV inhibitors are a possible option after metformin, and do not increase the risk of hypoglycaemia. SGLT-2 inhibition is however preferred because it promotes greater weight loss and may be associated with positive cardiovascular outcomes, whereas DPPIV inhibitors have a neutral effect on CV outcomes in reported studies.

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A 39-year-old woman presents to the clinic with polyuria, polydipsia and lethargy. She had undergone a total thyroidectomy some 2 years previously. On examination her BP is 148/89 mmHg, her pulse 80/min and regular. She has a neck scar consistent with thyroidectomy.

Investigations:

Hb	12.1 g/dl
WCC	7.3 $\times 10^9$/l
PLT	201 $\times 10^9$/l
Na^+	139 mmol/l
K^+	4.3 mmol/l
Creatinine	155 µmol/l
Ca^{++}	2.9 mmol/l
PTH	10.1 pmol/l (0.9-5.4)
Glucose	8.1 mmol/l

Which of the following is the most likely overarching diagnosis in this patient?

A Thyroid carcinoma with new recurrence

B Secondary hyperparathyroidism

C MEN-1

D MEN-2b

E MEN-2a

her BP is 148/89 mmHg, her pulse 80/min and regular. She has a neck scar consistent with thyroidectomy.

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Hb	12.1 g/dl
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Your answer was correct

A Thyroid carcinoma with new recurrence

B Secondary hyperparathyroidism

C MEN-1

D MEN-2b

E MEN-2a

Explanation

E MEN-2a

MEN-2 is associated with the development of medullary thyroid carcinoma, hyperparathyroidism and phaeochromocytoma. It is likely that the previous thyroidectomy was due to medullary carcinoma of the thyroid. Given that medullary thyroid carcinoma in MEN-2a tends to be less aggressive than in 2b, the presence of hypercalcaemia and the fact that the PTH is inappropriately elevated, the most likely diagnosis is one of hyperparathyroidism. The raised blood pressure and evidence of glucose intolerance also raises the possibility of co-existent phaeochromocytoma. Prior to any surgical intervention for hyperparathyroidism it is crucial to rule out phaeochromocytoma as a co-existent diagnosis.

A Thyroid carcinoma with new recurrence

This would not account for the elevated serum calcium seen here.

B Secondary hyperparathyroidism

This is essentially ruled out by the patient's renal function, which is only mildly abnormal, probably as a result of dehydration.

C MEN-1

MEN-1 is associated with parathyroid adenomas, pituitary adenomas and pancreatic endocrine tumours, but not with phaeochromocytoma. It is not associated with medullary thyroid cancer.

D MEN-2b

MEN-2b is associated with a marfanoid habitus, not

A 40-year-old man presents to the clinic for advice. He works as a solicitor, keeps fit, is of normal weight and is a non-smoker. He is worried as his father and brother both died of myocardial infarction during their early forties. On examination he is of normal weight with a BMI of 24 and has a blood pressure of 135/78 mmHg.

Fasting bloods reveal:

LDL cholesterol	6.0 mmol/l
Triglycerides	3.3 mmol/l
HDL cholesterol	0.8 mmol/l
Glucose	4.1 mmol/l
TSH	0.5mU/l (0.4-5)

What is the most appropriate action in this case?

A	Commence fenofibrate therapy
B	Reassure this gentleman that his cardiovascular risk is low and discharge him
C	Advise him to diet and reduce his fat intake
D	Start atorvastatin
E	Start ezetimibe

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Explanation

D Start atorvastatin

D Start atorvastatin

This man is likely to have familial combined hyperlipidaemia, present in around 1/250 individuals and associated with premature cardiovascular disease. The most common type of familial dyslipidaemia, it may be responsible for up to 10% of cases of premature cardiovascular disease. It is characterised by increased LDL and triglyceride levels, often accompanied by low HDL levels. A statin will reduce the risk of cardiovascular disease events and is the first-choice drug for primary and secondary prevention of cardiovascular disease.

A Commence fenofibrate therapy

Fenofibrate may be added to statin therapy if triglycerides remain high even after the LDL cholesterol concentration has been reduced adequately.

B Reassure this gentleman that his cardiovascular risk is low and discharge him

His blood tests show evidence of increased LDL and triglyeride levels, which puts him at increased risk of cardiovascular events.

C Advise him to diet and reduce his fat intake

Given that he already lives a healthy lifestyle, dietary modification is unlikely to significantly impact on his lipid parameters.

E Start ezetimibe

Ezetimibe as a monotherapy is recommended as an option for the treatment of primary hypercholesterolaemia in adults in whom initial statin therapy is contraindicated or

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D Start atorvastatin

E Start ezetimibe

Pastest+

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A 72-year-old obese man with type 2 diabetes comes to the clinic for review. He is managed with metformin 1 g BD and pioglitazone 30 mg. On examination, he has a large necrotic, malodorous ulcer over the right medial malleolus. You notice that he has bilateral peripheral oedema and varicose veins. Peripheral pulses are easily palpable and capillary return is normal. Dopplers done by the chiropody team in the clinic are also within acceptable limits. His pioglitazone is discontinued and a transition to insulin therapy is planned.

Investigations:

Hb	10.9 g/dl
WCC	5.4 x 10^9/l
PLT	200 x 10^9/l
Na^+	139 mmol/l
K^+	5.0 mmol/l
Creatinine	182 µmol/l
CRP	27 mg/l (<10 mg/l)
Wound swab	scanty faecal flora

Which of the following treatments is likely to be the most effective?

A Surgical debridement under GA

B Multi-layer compression bandaging

C Oral metronidazole

D Varicose vein stripping

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B	Multi-layer compression bandaging
C	Oral metronidazole
D	Varicose vein stripping
E	Mobilisation

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Investigations:

Hb	10.9 g/dl
WCC	5.4 x 10⁹/l
PLT	200 x 10⁹/l
Na⁺	139 mmol/l
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B Multi-layer compression bandaging

C Oral metronidazole

D Varicose vein stripping

E Mobilisation

Explanation

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Explanation

B Multi-layer compression bandaging

The fact that peripheral arteries are palpable and the normal Dopplers exclude the ischaemic origin of the ulcer. The location strongly suggests that this man's ulcer is venous. As such, the optimal management is compression bandaging. His white count is normal and the CRP is only just above normal, and thus infection is not likely to be the primary cause of his ulcer. Dressings may be employed that encourage de-sloughing, rather than progressing to definitive surgical debridement.

A Surgical debridement under GA

Surgical debridement is usually performed on diabetic foot ulcers that are infected and neuropathic, ischaemic or mixed in origin.

C Oral metronidazole

Depending upon sensitivities, an antibiotic with broad-spectrum activity, such as co-amoxiclav, may also be required. Metronidazole is reserved for ulcers where anaerobic infection is strongly suspected.

D Varicose vein stripping

This procedure is done under general or local anaesthetic to aid in the treatment of varicose veins and other manifestations of chronic venous disease. It is mainly performed when the symptoms are quite severe (pain/discomfort).

E Mobilisation

Rather than mobilisation, elevation of the leg above the

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E	Mobilisation

Rather than mobilisation, elevation of the leg above the level of the heart and rest, to reduce peripheral oedema, is the recommended course of action.

A 42-year-old woman is referred to the clinic with palpitations. Approximately 3 weeks ago she had suffered with flu and since then she has been getting occasional palpitations, anxiety attacks and loose bowel motions. Her weight has remained stable and she has previously been fit and well.

Examination reveals a tender thyroid, but no enlargement or focal masses. Her pulse rate is 110/min and regular.

Thyroid function tests:

TSH	0.3 mU/l (0.4-5)
T4	190 nmol/l (58-174)
T3	3.21 nmol/l (1.07-3.18)
ESR	45 mm/1st h (< 20)

What is the next most appropriate management step?

A	Carbimazole
B	Propylthiouracil
C	Ibuprofen
D	Radioiodine
E	Subtotal thyroidectomy

32860

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B Propylthiouracil

C Ibuprofen

D Radioiodine

E Subtotal thyroidectomy

Explanation

C Ibuprofen

Explanation

C Ibuprofen

Subacute thyroiditis is transient inflammation of the thyroid, which typically occurs in females in the fourth and fifth decade. Patients can have a preceding viral infection followed by mild symptoms of hyperthyroidism. The thyroid gland is usually tender by this time. If bloods are taken early, the patient can display a low thyroid-stimulating hormone (TSH) and raised thyroxine (T4)/tri-iodothyronine (T3). The mainstay of treatment is management of pain over the thyroid with NSAIDs. Prednisolone can be used if NSAIDS are ineffective. The symptoms should resolve but can take weeks to a few months to do so, and the patient's thyroid status should be monitored. Some patients are left hypothyroid after the inflammation has settled. Propranolol may be considered if palpitations or anxiety are particularly severe.

A Carbimazole

Carbimazole is used for Graves' thyrotoxicosis. It is a pro-drug which, after absorption, is converted to the active form, methimazole. Methimazole prevents thyroid peroxidase enzyme (TPO) from coupling and iodinating the tyrosine residues on thyroglobulin, hence reducing the production of the thyroid hormones (T3 and T4). In De Quervain's thyroiditis, the transient rise of T3 and T4 is self-limiting and doesn't require anti-thyroid medication.

B Propylthiouracil

This is used in Graves' thyrotoxicosis. It shares the same mechanism of action as carbimazole, but moreover inhibits the enzyme 5'-deiodinase which converts T4 to the more active form T3.

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This is used in Graves' thyrotoxicosis. It shares the same mechanism of action as carbimazole, but moreover inhibits the enzyme 5'-deiodinase which converts T4 to the more active form T3.

D	Radioiodine.

This is used in Graves' thyrotoxicosis when not complicated by thyroid eye disease, as there is a chance that it may aggravate its course.

E	Subtotal thyroidectomy

This is considered in the case of a toxic adenoma or when the cytology results following fine-needle aspiration (FNA) of a nodule raise the suspicion of malignancy.

A 67-year-old man with a history of type 2 diabetes and hypertension comes to the Emergency Department with weakness of the right-hand side of his face and his right arm of 30 min duration. The weakness came on suddenly and shortly after its onset his wife called an ambulance.

On examination, his BP is 185/100 mmHg, pulse is 82/min and regular. You note weakness of the right-hand side of his face and right arm, there are no other neurological deficits. Routine bloods reveal a glucose of 8.9 mmol/l, but are otherwise normal.

Which of the following is the most likely diagnosis?

A Inflammatory neuropathy

B Lacunar syndrome stroke (LACS)

C Partial anterior circulation syndrome stroke (PACS)

D Posterior circulation syndrome stroke (POCS)

E Total anterior circulation syndrome stroke (TACS)

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Explanation

B Lacunar syndrome stroke (LACS)

LACS is defined by one of the following:

- Unilateral weakness (and/or sensory deficit) of face and arm, arm and leg or all three.

B	Lacunar syndrome stroke (LACS)

LACS is defined by one of the following:

- Unilateral weakness (and/or sensory deficit) of face and arm, arm and leg or all three.
- Pure sensory stroke.
- Ataxic hemiparesis

The pattern of both face and arm weakness is unlikely to be due to an underlying inflammatory neuropathy.

A	Inflammatory neuropathy

The pattern of both face and arm weakness is unlikely to be due to an underlying inflammatory neuropathy.

C	Partial anterior circulation syndrome stroke (PACS)

PACS is defined by two of the following:

- Unilateral weakness (and/or sensory deficit) of face, arm and leg
- Homonymous hemianopia
- Higher cerebral dysfunction (dysphasia, visuospatial disorder)

D	Posterior circulation syndrome stroke (POCS)

POCS is defined by one of the following:

- Cerebellar or brainstem syndromes
- Loss of consciousness

disorder)

D Posterior circulation syndrome stroke (POCS)

POCS is defined by one of the following:

- Cerebellar or brainstem syndromes
- Loss of consciousness
- Isolated homonymous hemianopia

E Total anterior circulation syndrome stroke (TACS)

TACS is defined by all three of the following:

- Unilateral weakness (and/or sensory deficit) of face, arm and leg
- Homonymous hemianopia
- Higher cerebral dysfunction (dysphasia, visuospatial disorder)

A 51-year-old obese woman with type 2 diabetes comes to the clinic for review. She has completed a period of diet and exercise since her diagnosis 3 months ago. There is also a history of hypertension and dyslipidaemia, which is managed with ramipril and atorvastatin. On examination her BMI is 33, and her BP is 145/82 mmHg. You review her home blood glucose monitoring and find average fasting sugars of around 8.8 mmol/l, with postprandial excursions up to 15.5 mmol/l.

Investigations:

Hb	14.1 g/dl
WCC	4.5 $\times 10^9$/l
PLT	142 $\times 10^9$/l
Na^+	141 mmol/l
K^+	4.8 mmol/l
Creatinine	100 µmol/l
HbA1c	68.31 mmol/mol (8.4%)

Which of the following is the most appropriate next management step for her?

A Sitagliptin

B Metformin

C Pioglitazone

D Dapagliflozin

E Gliclazide

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Question 23 of 26

K^+	4.8 mmol/l
Creatinine	100 µmol/l
HbA1c	68.31 mmol/mol (8.4%)

Which of the following is the most appropriate next management step for her?

Your answer was correct

A Sitagliptin

B Metformin

C Pioglitazone

D Dapagliflozin

E Gliclazide

Explanation

B Metformin

B Metformin

Guidelines from the ADA/EASD, and those from NICE recommend metformin as the initial management step for patients with type 2 diabetes who have not achieved adequate blood glucose control. This is based on evidence from UKPDS supporting a cardiovascular outcomes benefit, the fact that metformin use is associated with modest weight loss, and the fact that it is a generic cost-effective option.

A Sitagliptin

Sitagliptin is s DPPIV inhibitor which is weight neutral, but is not associated with positive cardiovascular outcomes. As such, it as a consideration as a potential alternative to metformin in patients who cannot tolerate it.

C Pioglitazone

In an obese woman, use of

Question 24 of 26

A 58-year-old patient who has a history of hypertension is operated on by the neurosurgeons for an intracranial haemorrhage. Over the next few days his serum sodium level progressively declines and by the third day has fallen to 118 mmol/l despite fluid restriction to 1 litre per day. His blood pressure has maintained steady at 145/85 mmHg. Examination reveals no signs of left ventricular failure or peripheral oedema. Urine osmolality ~700 mosmol/l, urinary sodium is raised at 80 mmol/l. Serum potassium is 4.3 mmol/l.

Which of the following fits best with the diagnosis in this patient?

Your answer was correct

A Addisonian crisis

B Secretion of inappropriate antidiuretic hormone (SIADH)

C Cranial diabetes insipidus

Question 24 of 26

raised at 80 mmol/l. Serum potassium is 4.3 mmol/l.

Which of the following fits best with the diagnosis in this patient?

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A Addisonian crisis

B Secretion of inappropriate antidiuretic hormone (SIADH)

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D Hypovolaemia

E Fluid overload

Explanation

B Secretion of inappropriate antidiuretic hormone (SIADH)

SIADH is well known to occur after

B Secretion of inappropriate antidiuretic hormone (SIADH)

SIADH is well known to occur after head injury, central nervous system (CNS) infection or intracranial haemorrhage. It is associated with hyponatraemia and hypotonic plasma, raised urine osmolality and excessive urinary sodium excretion (often >50 mmol/l). SIADH is often a transient phenomenon and resolves after a few days; in patients who fail to respond to fluid restriction, demeclocycline, which induces partial diabetes insipidus, may be a treatment option.

A Addisonian crisis

Addisonian crisis is associated with significant salt wasting and consequent hypotension, not present here, making Addison’s less likely as the underlying cause of his hyponatraemia.

C Cranial diabetes insipidus

C Cranial diabetes insipidus

Cranial diabetes insipidus is associated with hypernatraemia and hypotension, rather than the picture seen here.

D Hypovolaemia

The steady maintenance of blood pressure above 140 mmHg systolic effectively rules out significant hypovolaemia.

E Fluid overload

Fluid overload is both associated with hyponatraemia and signs of heart failure or peripheral oedema, neither of which is seen in the scenario here.

6552

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A 21-year-old man presents for review with concerns about his sexual function. He has recently begun a relationship with a woman and is unable to become sexually aroused. Past history of note includes repair of cleft lip and palate.

On examination, he is normal height and is thin. He has failure of development of secondary sexual characteristics.

Other history of note includes a lack of sense of smell, which he puts down to an accident as a toddler. He wishes to settle down with this woman and may start a family soon.

Investigations:

TSH	Normal
LH	Low
FSH	Low
Testosterone	Low

Which of the following is the most appropriate treatment?

LH	Low
FSH	Low
Testosterone	Low

Which of the following is the most appropriate treatment?

Your answer was correct

A Testosterone supplementation

B Continuous GnRH therapy

C Pulsed GnRH therapy

D FSH therapy

E LH therapy

Explanation

C Pulsed GnRH therapy

C Pulsed GnRH therapy

This patient is thought to have Kallmann syndrome and a failure of GnRH, and hence LH, FSH secretion. The history of cleft palate defect and lack of sense of smell both fit best with this as the most likely diagnosis. It is due to disordered migration of GnRH-producing neurones to the hypothalamus. It has an incidence of 1 in 10,000 males, with a male to female ratio of 4:1. Anosmia is present in 75% and there is an increased association with cleft lip and palate.

Pulsed GnRH treatment is needed to restore LH and FSH release. It needs to be continued for as long as fertility is required. Once his family is complete, switching to testosterone therapy may be more convenient for him.

A Testosterone supplementation

Although this restores secondary sexual characteristics, it doesn’t restore fertility and is therefore not

appropriate here.

B Continuous GnRH therapy

As natural GnRH release is pulsatile, continuous therapy fails to lead to LH and FSH release.

D FSH therapy

FSH can be used to induce fertility, but it is thought to be potentially less effective than pulsed GnRH therapy. Long-acting preparations of FSH do exist, though, which may be more convenient with respect to administration.

E LH therapy

LH can be used in conjunction with FSH to induce fertility in women with Kallmann syndrome.

32908

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A 29-year-old woman who is 30 weeks' pregnant comes to the Endocrine Clinic for review. She has found it increasingly difficult to maintain her weight during the past few weeks, and has been suffering from palpitations and anxiety. She has no past medical history of note.

Examination reveals a BP of 122/72 mmHg, with pulse 88/min and regular. She has a fine resting tremor and a smooth, non-tender goitre.

Investigations:

Hb	11.9 g/dl
WCC	7.1 × 10^9/l
PLT	181 × 10^9/l
Na^+	137 mmol/l
K^+	4.3 mmol/l
Creatinine	84 μmol/l
Glucose	4.8 mmol/l
TSH	< 0.05 U/l

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TSH	< 0.05 U/l
Free T4	40 pmol/l
Anti-thyroid antibody	+

Which of the following is the most appropriate intervention?

Your answer was correct

A Carbimazole

B Carbimazole and thyroxine (block-replace)

C Radioiodine

D Propylthiouracil

E Propylthiouracil and thyroxine (block-replace)

A Carbimazole

This patient has thyrotoxicosis, potentially due to underlying Graves' disease. The recommended treatment approach is to give enough anti-thyroid drug therapy to maintain thyroid hormone levels in the upper third of the normal range. Carbimazole is the recommended option in late pregnancy because of reports of hepatotoxicity associated with propylthiouracil.

B Carbimazole and thyroxine (block-replace)

Thyroxine does not cross the placenta to any appreciable degree, and therefore block-replace is not recommended in pregnancy.

C Radioiodine

Radioiodine is contraindicated in pregnancy because administration

Radioiodine is contraindicated in pregnancy because administration would lead to uptake in the fetal thyroid.

D	Propylthiouracil

Propylthiouracil may be used in early pregnancy, but in late pregnancy it is not recommended because of risk of hepatotoxicity.

E	Propylthiouracil and thyroxine (block-replace)

Block-replace is not indicated because of thyroxine not crossing the placental barrier.

39026

A 24-year-old woman who is 24 weeks' pregnant is referred to the clinic complaining of increasing tiredness, emotional lability, tiredness particularly in the evenings, and episodes of palpitations. Her GP has put this down to the normal stresses and strains associated with a first pregnancy. On examination she looks tired, her BP is 125/78 mmHg and her pulse is 90/min at rest. You notice that she has sweaty palms. There is a small, smooth goitre on palpation.

Investigations:

Hb	11.0 g/dl
WCC	5.4 $\times 10^9$/l
PLT	182 $\times 10^9$/l
Na^+	139 mmol/l
K^+	4.1 mmol/l
Creatinine	100 µmol/l
TSH	<0.05 U/l (<0.5-4.5)

Which of the following is the most likely diagnosis?

A Hyperemesis gravidarum

B Anxiety

C Hashimoto's thyroiditis

D Graves' disease

E Toxic adenoma

Explanation

D Graves' disease

Thyrotoxicosis, of which 85% of cases are due to Graves' disease, occurs in 0.1-0.4% of all pregnancies. Whilst her reported symptoms may be reflective of the anxiety experienced by many pregnant women, they seem particularly severe, and the presence of a suppressed TSH points towards the diagnosis.

A Hyperemesis gravidarum

This may be associated with TSH suppression, but it isn't usually suppressed below the lower limit of quantification, and is not usually associated with frank symptoms of thyrotoxicosis.

B Anxiety

The goitre, signs of thyrotoxicosis and suppressed TSH effectively rule out anxiety as the cause of symptoms here.

C Hashimoto's thyroiditis

Hashimoto's thyroiditis is of course associated with hypothyroidism rather than the picture of thyrotoxicosis seen here.

E Toxic adenoma

A toxic adenoma isn't associated with a goitre, but with a discrete nodule. The suppressed TSH would, however, fit with a toxic adenoma.

Question 2 of 136

A 42-year-old Portuguese woman presents to her GP with increasing lethargy. He had seen her twice in the past few months and commenced antidepressants at her last appointment. Most recently, she had been complaining of increasing nausea and vomiting and had lost a considerable amount of weight.

On examination, her blood pressure was 105/65 mmHg and her BMI was 21. There was a postural drop of 20 mmHg in her blood pressure on standing, with a corresponding increase in her pulse rate.

Investigations:

$Na^{=}$	126 mmol/l
K^{+}	4.8 mmol/l
TSH	7 mU/l (0.4-5)
Free T4	7 pmol/l (10-22)
Urea	10.1 mmol/l
Hb	10.1 g/dl (normochromic, normocytic), eosinophil count raised

Which of the following is the initial treatment of choice in this patient?

A Thyroxine

B Fludrocortisone

C Hydrocortisone

D IV 5% dextrose

E Fluid restriction

Explanation

C **Hydrocortisone**

This patient has the clinical features of adrenal insufficiency, with hyponatraemia, a raised urea, normochromic normocytic anaemia with eosinophilia and a relatively high potassium level despite repeated episodes of vomiting. She should not be treated with thyroxine at this stage: thyroid function testing should be repeated after treatment with corticosteroids. She should be rehydrated, but with N saline. Autoimmune adrenalitis is the commonest cause of primary adrenal insufficiency. Metastatic carcinoma from lung, breast or kidney primaries is also known to result in adrenal failure. Infiltration due to amyloid, infection due to tuberculosis, vascular haemorrhage or infarction are other documented causes.

A Thyroxine

Mild biochemical hypothyroidism often accompanies adrenal insufficiency, but early treatment of abnormal thyroid numbers, particularly before corticosteroid stabilisation, may further decompensate the adrenal insufficiency.

B Fludrocortisone

This is used for mineralocorticoid insufficiency leading to postural hypotension. In Addison's disease, because corticosteroid replacement therapy usually exerts a mineralocorticoid effect, fludrocortisone is not first-line treatment.

D IV 5% dextrose

Adrenal insufficiency manifesting with adrenal crisis is associated with volume depletion, and therefore normal

A 32-year-old woman who is known to have autoimmune hypothyroidism presents with nausea, vomiting and lethargy. Medication of note includes thyroxine and the oral contraceptive pill. On examination her BP is 110/70 mmHg, with a pulse of 70/min; she has a postural drop of 20 mmHg on standing and her pulse increases by 10/min. She has areas of vitiligo on skin examination.

Investigations:

Hb	10.5 g/dl
WCC	7.4 $\times 10^9$/l
PLT	201 $\times 10^9$/l
Na^+	124 mmol/l
K^+	4.5 mmol/l
Creatinine	132 µmol/l

Which of the following is the most likely diagnosis?

A Autoimmune polyglandular syndrome type 1

B Autoimmune polyglandular syndrome type 2

C Gastroenteritis

D Isolated new onset Addison's disease

E Pernicious anaemia

Explanation

B **Autoimmune polyglandular syndrome type 2**

This is the commonest subtype, and includes autoimmune Addison's disease in combination with thyroid disease and/or type 1 diabetes mellitus. There are associations with other autoimmune conditions such as coeliac disease and pernicious anaemia, which could explain the anaemia, and primary hypogonadism and myasthenia gravis are also commonly observed.

A **Autoimmune polyglandular syndrome type 1**

Type 1 polyglandular syndrome is associated with mucocutaneous candidiasis, not vitiligo. It also encompasses both autoimmune hypoparathyroidism and hypoadrenalism.

C **Gastroenteritis**

Gastroenteritis is a self-limiting infectious illness causing diarrhoea and vomiting, and is not normally associated with anaemia or hyponatraemia.

D **Isolated new onset Addison's disease**

This lady possibly does have a new diagnosis of Addison's disease, but in view of her other autoimmune history this option is incorrect.

E **Pernicious anaemia**

A 67-year-old man has been diagnosed with type 2 diabetes coinciding with presentation to the Emergency room with an acute myocardial infarction. For the past 3 months he has been managed with diet and lifestyle advice. On examination his BMI is 34 and his BP is 145/82 mmHg; cardiovascular and respiratory examination is unremarkable.

Investigations:

Hb	12.1 g/dl
WCC	5.6 $\times 10^9$/l
PLT	190 $\times 10^9$/l
Na^+	141 mmol/l
K^+	4.8 mmol/l
Creatinine	250 µmol/l
HbA1c	73.77 mmol/mol (8.9%) (75.96 mmol/mol, 9.1% 3 months earlier)

Which of the following is the most appropriate next step?

A	Insulin
B	Metformin
C	Gliclazide
D	Pioglitazone
E	Empagliflozin

Question 4 of 136

Hb	12.1 g/dl
WCC	5.6 x10⁹/l
PLT	190 x10⁹/l
Na⁺	141 mmol/l
K⁺	4.8 mmol/l
Creatinine	250 µmol/l
HbA1c	73.77 mmol/mol (8.9%) (75.96 mmol/mol, 9.1% 3 months earlier)

Which of the following is the most appropriate next step?

Your answer was correct

A Insulin

B Metformin

C Gliclazide

D Pioglitazone

E Empagliflozin

Explanation

A Insulin

Although insulin will result in weight gain in this situation, it is the only realistic option from those listed to achieve HbA1c target given this patient also has renal impairment. Given he has suffered a previous MI, a basal bolus approach would be preferred to drive a greater chance of

A Insulin

Although insulin will result in weight gain in this situation, it is the only realistic option from those listed to achieve HbA1c target given this patient also has renal impairment. Given he has suffered a previous MI, a basal bolus approach would be preferred to drive a greater chance of achieving blood glucose control with less chance of hypoglycaemia.

B Metformin

Metformin is contraindicated in patients with a GFR <30, which would almost certainly be indicated by a creatinine of 250.

C Gliclazide

Sulphonylureas are not recommended in patients with renal impairment because of risks of accumulation and hypoglycaemia.

D Pioglitazone

Pioglitazone drives increased risk of fluid retention, which can exacerbate heart failure; it should therefore be avoided in a patient with a previous history of MI.

E Empagliflozin

Although SGLT-2 inhibitors do have modest positive effects on blood pressure and uric acid excretion, they have only a limited effect on blood glucose, and this is blunted by renal impairment.

A 61-year-old man, who has had type 2 diabetes for the past 8 years, comes to the clinic for review. He has found it increasingly difficult to maintain his HbA1c at target on metformin 1g BD, empagliflozin 25 mg and vildagliptin 100 mg per day. He has also gained 6 kg in weight over the past year.

His BP is 142/90 mmHg pulse is 78/min and regular. Respiratory examination is unremarkable. Abdomen is soft and non-tender, and his BMI is 36.

Investigations:

Hb	131 g/l
WCC	7.0 × 10⁹/l
PLT	181 × 10⁹/l
Na	139 mmol/l
K	4.3 mmol/l
Creatinine	100 µmol/l
Glucose	7.1 mmol/l
HbA1c	62 mmol/mol (7.8%)

Which of the following is the most appropriate next step?

A	Add basal insulin
B	Continue two orals and add liraglutide
C	Refer for bariatric surgery
D	Stop oral treatment and transition to mixed insulin
E	Stop oral treatment and transition to basal bolus

B Continue two orals and add liraglutide

In this situation, with a BMI of >35, NICE guidelines allow for a trial of GLP-1 analogue. They recommend reassessment of response to therapy after 3 months, to ensure that adequate HbA1c reduction (>1%), and weight loss of 3% or more has been achieved. The vildagliptin should be discontinued as trials of DPPIV inhibitor and GLP-1 together suggest no added efficacy versus GLP-1 alone.

A Add basal insulin

This patient is significantly obese; as such although adding basal insulin may improve HbA1c, it is likely to result in significant further weight gain and adverse effects including weight gain and hypoglycaemia. In particular, in patients with long term diabetes, hypoglycaemia may risk cardiac arrhythmia.

C Refer for bariatric surgery

Although this patient would qualify for bariatric surgery, a trial of GLP-1 agonist therapy is indicated first, given the morbidity associated with a permanent surgical solution.

D Stop oral treatment and transition to mixed insulin

In Type 2 diabetes continuing medications such as metformin and SGLT-2 inhibitor can limit weight gain in patients starting insulin therapy, and mixed insulin could potentially offer suboptimal glycaemic control.

E Stop oral treatment and transition to basal bolus insulin

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C	Refer for bariatric surgery

Although this patient would qualify for bariatric surgery, a trial of GLP-1 agonist therapy is indicated first, given the morbidity associated with a permanent surgical solution.

D	Stop oral treatment and transition to mixed insulin

In Type 2 diabetes continuing medications such as metformin and SGLT-2 inhibitor can limit weight gain in patients starting insulin therapy, and mixed insulin could potentially offer suboptimal glycaemic control.

E	Stop oral treatment and transition to basal bolus insulin

Although basal bolus insulin can optimise insulin delivery, continuing metformin and SGLT-2 seems sensible in this case to limit weight gain on insulin initiation.

A 58-year-old man who has both type 1 DM and chronic kidney disease managed with haemodialysis comes to the clinic for review. He was previously noted to have raised PTH and started on $CaCO_3$ and twice weekly vitamin D at the high dose. He has recently begun suffering from depression. He has suffered two previous myocardial infarctions and had a spinal anaesthetic for a hip injury in the past year.

Investigations:

Hb	11.0 g/dl
WCC	4.5×10^9/l
PLT	199×10^9/l
Na^+	139 mmol/l
K^+	5.2 mmol/l
Creatinine	634 µmol/l
PTH	40 pmol/l
Ca^{++}	2.2 mmol/l (2.2-2.6 mmol/l)
PO_4^{3-}	1.45 mmol/l (0.8-1.4 mmol/l)

Which of the following is the next most appropriate management step for this patient?

A	Parathyroidectomy
B	Increased dose of vitamin D
C	Sevelamer
D	Cinacalcet

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Which of the following is the next most appropriate management step for this patient?

A Parathyroidectomy

B Increased dose of vitamin D

C Sevelamer

D Cinacalcet

E Aluminium hydroxide

D Cinacalcet

This man has hyperparathyroidism, with a PTH that has failed to suppress in response to calcium and vitamin D. As such, the next most appropriate step is cinacalcet. It works as an agonist at the site of the calcium sensor on the parathyroid gland. This leads to a suppression of PTH levels. Cinacalcet may currently be used in patients on renal replacement therapy as an adjunct to vitamin D or phosphate binders.

C Sevelamer

Sevelamer is a phosphate binder, and given that phosphate is only just above the normal range, it's not going to significantly impact on the clinical picture seen here.

A Parathyroidectomy

Given this patient's history of myocardial infarctions and the fact he received a spinal anaesthetic for a hip replacement last year, he is very unlikely to be a candidate for operative intervention for hyperparathyroidism.

B Increased dose of vitamin D

PTH is in the treatment range, and calcium is in the normal range,, supplementing further with vitamin D is therefore very unlikely to drive down levels of parathyroid hormone.

E Aluminium hydroxide

Aluminium hydroxide, an alternative phosphate binder is now used less frequently because of risks of accumulation and the impact on cognitive function.

A 44-year-old man is referred to clinic with headaches and a raised fasting glucose of 7.5 mmol/l. He has also noticed a change in his facial appearance and enlargement of his hands.

Examination reveals prognathism, enlarged digits and bitemporal hemianopia. His BP is elevated at 155/90 mmHg. An oral glucose tolerance test with growth hormone levels showed a blood glucose of 11.5 mmol/l at 120 min and also failure to suppress growth hormone levels.

An MRI scan of the pituitary fossa revealed an adenoma that was abutting the optic chiasm. Treatment options were explained to the patient and he opted for medical therapy rather surgery (transphenoidal resection of the adenoma).

Which of the following is the most appropriate initial medical therapy for him?

A Insulin

B Glucagon

C Bromocriptine

D Somatostatin analogue

E Pegvisomant

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D Somatostatin analogue

This gentleman has acromegaly. Acromegaly is usually related to a pituitary adenoma, although it is occasionally caused by ectopic secretion of growth hormone from malignant cells. This results in coarsening of facial features, prognathism and macroglossia. Patients are at increased risk of cardiovascular disease with hypertension and diabetes. Transphenoidal removal of the adenoma would be curative and is the first-line treatment option.

A Insulin

The excess secretion of growth hormone in acromegaly results in increased insulin resistance and diabetes. Some patients require dietary intervention only, oral hypoglycaemic agents or insulin. In this case, there is insufficient information regarding the glycaemic control of the patient and whether he will require insulin or not. In any case, priority is the treatment of acromegaly since diabetes usually subsequently resolves.

B Glucagon

This is used for the treatment of severe hypoglycaemia when the patient is unconscious or unable to receive glucose orally.

C Bromocriptine

This is a dopamine agonist used for the treatment of prolactinomas as an alternative to cabergoline.

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This is a dopamine agonist used for the treatment of prolactinomas as an alternative to cabergoline.

E	Pegvisomant

This is a growth hormone receptor antagonist and is a third-line treatment when surgery, radiotherapy and somatostatin analogues are not effective.

A 56-year-old man presents to his doctor for review. He has been suffering particularly from increased bony pain around his lower back and pelvic region over the past few months. Some degree of hearing loss was diagnosed two years ago. Blood testing reveals normal calcium levels but alkaline phosphatase is raised. X-rays reveal skull features consistent with Paget's disease, and increased activity on bone scanning is seen in the lumbar vertebrae and pelvis. You commence bisphosphonate treatment.

Which of the following represents the most appropriate way to monitor disease activity in this man?

A	3-monthly alkaline phosphatase levels
B	6-monthly alkaline phosphatase levels
C	6-monthly acid phosphatase levels
D	6-monthly calcium levels
E	Yearly isotope bone scan

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B 6-monthly alkaline phosphatase levels

The goals of therapy in Paget's disease are to normalise bone turnover and achieve an alkaline phosphatase as a marker of this, in the normal range if possible. Bisphosphonates have become the mainstay of therapy, with daily, weekly, monthly and intravenous intermittent formulations now all possibilities for treatment. It appears that the more aggressive initial therapy is, then the longer a period of remission may be achieved. Alkaline phosphatase, as a non-invasive method, appears to be the best way to monitor disease activity. Levels should be checked at 6 months, and subsequently every 6-12 months.

E Yearly isotope bone scan

It is unclear whether normalisation of appearances on isotope bone scan correlates to clinical outcome. It is therefore difficult to justify the use of serial bone scans to monitor treatment in view of the radiation dose involved.

A 3-monthly alkaline phosphatase levels

Alkaline phosphatase levels can take 3-4 months to normalise following treatment.

C 6-monthly acid phosphatase levels

Serum total acid phosphatase is an osteoclastic enzyme that may be elevated in active Paget's disease, but is not as reliable in males as it can also be raised in prostate cancer.

D 6-monthly calcium levels

Calcium is normal in Paget's disease.

E	Yearly isotope bone scan

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D	6-monthly calcium levels

Calcium is normal in Paget's disease.

A 23-year-old final year medical student presents to the student health service complaining of increased hairiness and trouble with acne. Her periods are erratic and she is an intermittent user of the oral contraceptive pill.

On examination, her BMI is 31 and her blood pressure is mildly elevated at 145/89 mmHg. She has slight thinning of the hair on the front of her head, increased hair around her moustache and beard line, and hair around her nipples and lower abdomen.

Investigations:

LH/FSH ratio	Increased
Testosterone level	5 nmol/l (1-2.5 nmol/l)

Which of the following is the investigation most likely to confirm the diagnosis in this case?

A	Transvaginal ultrasound scan
B	Pituitary MRI
C	17-OH progesterone levels
D	Adrenal ultrasound scan
E	Karyotyping

A Transvaginal ultrasound scan

This patient's clinical picture is suggestive of polycystic ovarian syndrome (PCOS), and transvaginal ultrasound is said to have 91% diagnostic sensitivity for the condition in experienced hands. The presence of more than eight follicular cysts <10 mm and increased ovarian stroma is sufficient to make the diagnosis. Cyproterone acetate is useful for suppression of ovarian androgens, and electrolysis is useful for reducing hirsutism. Metformin increases insulin sensitivity, and therefore has positive effects on associated metabolic features and helps restore ovulatory function. Weight loss is, however, the gold-standard treatment for PCOS and improves ovulation, androgen levels, hirsutism and metabolic features associated with insulin resistance. A loss in weight of only 5% reduces hirsutism by up to 40%.

C 17-OH progesterone levels

This test is used as screening for congenital adrenal hyperplasia (CAH).

- Females with severe CAH due to deficiencies of 21-hydroxylase, 11-beta-hydroxylase or 3-beta-hydroxysteroid dehydrogenase have ambiguous genitalia at birth (classic virilising adrenal hyperplasia).
- Females with mild 21-hydroxylase deficiency are identified later in childhood because of precocious pubic hair, clitoromegaly or both, often accompanied by accelerated growth and skeletal maturation (simple virilising adrenal hyperplasia).
- Females with still milder deficiencies of 21-hydroxylase or 3-beta-hydroxysteroid dehydrogenase activity may present in adolescence

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- Females with still milder deficiencies of 21-hydroxylase or 3-beta-hydroxysteroid dehydrogenase activity may present in adolescence or adulthood with oligomenorrhea, hirsutism and/or infertility (non-classic adrenal hyperplasia).
- Females with 17-hydroxylase deficiency appear phenotypically female at birth but do not develop breasts or menstruate in adolescence; they may present with hypertension.

Our case could phenotypically resemble non-classic adrenal hyperplasia, although the biochemical profile and the excess weight point towards PCOS.

B Pituitary MRI

This would be the investigation of choice if a pituitary

Rana Alnasser's screen a cause of amenorrhea. In that

A 28-year-old single woman presents to the Endocrine Clinic with recent symptoms of sweating, weight loss and palpitations. She tells you that there is a history of thyroid disease in the family and she has recently applied for a job as a nurse because she wants to help people.

On examination, she has a BMI of 20, there is no palpable goitre and a tremor is noted.

Investigations:

Hb	125 g/dl
WCC	$6.5 \times 10^9/l$
PLT	$203 \times 10^9/l$
Na^+	138 mmol/l
K^+	4.5 mmol/l
Creatinine	90 μmol/l
Glucose	5.7 mmol/l
TSH	< 0.05 mU/l (0.5–4)
Free T4	32.1 pmol/l (10–22)
Thyroid scintography	revealed decreased uptake

Which of the following is the most appropriate next investigation?

A Thyroid ultrasound scan

B Fine needle aspiration biopsy

C Beta HCG

D Thyroglobulin levels

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A	Thyroid ultrasound scan
B	Fine needle aspiration biopsy
C	Beta HCG
D	Thyroglobulin levels
E	Abdominal ultrasound scan

D Thyroglobulin levels

E Abdominal ultrasound scan

Explanation

D Thyroglobulin levels

One possible cause of recent-onset thyrotoxicosis is thyroiditis. Thyroglobulin levels can be used to differentiat thyroiditis and other causes of hyperthyroidism from thyrotoxicosis factitia. Low thyroglobulin levels are associated with a diagnosis of thyrotoxicosis factitia (inappropriate abuse of thyroid hormone), and this is also associated with absence of thyroid enlargement and suppressed TSH in the presence of elevated T4 levels. Decreased isotope uptake is seen on thyroid scanning. Expert psychiatric input is advised in cases such as this one, as presentation of the diagnosis may be met with a hostile reaction and appropriate psychological assessment is required.

A Thyroid ultrasound scan

Thyroid ultrasound scanning is most useful in identifying small thyroid masses that can't be detected on palpation alone.

B Fine needle aspiration biopsy

Fine needle aspiration biopsy is most useful in identifying the histology of cold nodules, identified on ultrasound scan.

C Beta HCG

Thyroid ultrasound scanning is most useful in identifying small thyroid masses that can't be detected on palpation alone.

B	Fine needle aspiration biopsy

Fine needle aspiration biopsy is most useful in identifying the histology of cold nodules, identified on ultrasound scan.

C	Beta HCG

There are no signs of pregnancy, where elevated beta HCG which suppresses TSH is seen. It doesn't normally cause symptoms of thyrotoxicosis.

E	Abdominal ultrasound scan

Abdominal ultrasound scanning is useful in identifying intra-abdominal tumours producing thyroid hormone, although these are extremely rare and unlikely to be the cause of symptoms seen here.

A 21-year-old student with type 1 diabetes is brought to the Emergency Department by her flat-mates. She has been suffering from a cold for a few days.

On examination, her GCS is 12, and she has a respiratory rate of 40/min. Finger-prick blood glucose in the department is measured at 38.1 mmol/l and this is confirmed on venous sampling. Arterial blood gases reveal a pH of 7.05 and serum bicarbonate of 12 mmol/l. Electrolytes are abnormal, with potassium of 5.9 mmol/l, urea of 15.5 mmol/l and creatinine of 193 mmol/l.

Which of the following options would represent the most appropriate initial treatment for her?

A	1 litre of normal saline over 8 h
B	1 litre of normal saline stat
C	1 litre of Hartmann's over 4 h
D	1 mmol of sodium bicarbonate/kg IV over 30 min
E	Intubation and ventilation

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E	Intubation and ventilation

Explanation

B 1 litre of normal saline stat

This patient presents with diabetic ketoacidosis, the likely precipitant of which has been her recent respiratory infection. Initial investigations of choice for diabetic ketoacidosis (DKA) include blood for urea, electrolytes and

B 1 litre of normal saline stat

This patient presents with diabetic ketoacidosis, the likely precipitant of which has been her recent respiratory infection. Initial investigations of choice for diabetic ketoacidosis (DKA) include blood for urea, electrolytes and glucose, full blood count, arterial blood gases, blood and urine cultures, chest radiograph and electrocardiogram (ECG). Initial management involves 2 l of 1 M saline administered over 2 h unless the patient has cardiovascular or fluid management issues. Potassium administration is set according to serum potassium (intravenous (IV) insulin may result in rapid potassium reduction); the recommended dosage ranges from 40 mmol/l K^+ added per litre bag of 1 M/saline if serum potassium is <3 mmol/l, to no potassium added if serum potassium is 6.0 mmol/l or above. Where potassium is <3, management on the ITU where central venous access delivery of potassium can be carried out, is preferred. An IV fixed-rate insulin infusion is also started to combat hyperglycaemia.

A 1 litre of normal saline over 8 h

Patients presenting with DKA may be fluid depleted by up to 5 l. As such, delivering 1 l over 8 h is far too slow an infusion rate.

C 1 litre of Hartmann's over 4 h

It's argued that Hartmann's shouldn't be used as initial fluid replacement because it delivers a lactate load, and patients already have a high lactate/pyruvate ratio in DKA.

D 1 mmol of sodium bicarbonate/kg IV over 30 min

At this stage the initial response to aggressive fluid resuscitation and insulin delivered IV should be assessed

An 18-year-old man has been referred to the endocrinology clinic. He presents with short stature (less than the lower 3rd centile) with his weight being between the 10th and 15th centiles. On examination he has no pubic hair and pre-pubertal testes. There is no family history and he is currently well apart from a 6-month history of headaches. Appropriate investigations and imaging studies are arranged for the patient, and the result of the CT scan of the head shows the presence of a suprasellar calcified cyst with the cyst content having the same density as the CSF.

What is the diagnosis?

A	Idiopathic intracranial hypertension
B	Craniopharyngioma
C	Low-grade astrocytoma
D	Neurosarcoidosis
E	Tolosa-Hunt syndrome

Question 12 of 136

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What is the diagnosis?

Your answer was correct

A Idiopathic intracranial hypertension

B Craniopharyngioma

C Low-grade astrocytoma

D Neurosarcoidosis

E Tolosa-Hunt syndrome

Explanation

B Craniopharyngioma

Craniopharyngioma is a slow-growing, calcified cystic tumour arising from the remnants of the craniopharyngeal duct. It compromises 4.2% of all childhood tumours and is slightly more common in males than females. The

B Craniopharyngioma

Craniopharyngioma is a slow-growing, calcified cystic tumour arising from the remnants of the craniopharyngeal duct. It compromises 4.2% of all childhood tumours and is slightly more common in males than females. The symptoms develop very slowly and usually manifest once the tumour has attained a diameter of 3 cm. The commonest presentation in young patients is growth failure and delayed puberty. The radiological hallmark of a craniopharyngioma is the presence of a suprasellar calcified cyst, with calcification being more common in children than in adults. Using imaging studies, CT is most useful in demonstrating the calcifications whereas MRI is essential for defining the local anatomy prior to surgical intervention. Surgery is the management of choice and may attempt to resect the tumour in total, or to reduce the size followed by postoperative radiotherapy treatment.

A Idiopathic intracranial hypertension

The most common symptom of idiopathic intracranial hypertension is headache, but it should not cause developmental delay. CT of the head may show ventricles that are slightly reduced in size.

C Low-grade astrocytoma

Astrocytomas commonly present with headaches and seizures, or with other symptoms of raised intracranial pressure.

D Neurosarcoidosis

Neurosarcoidosis presents with a cranial neuropathy in 60-70%, usually involving the 7th cranial nerve. Aseptic

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A 54-year-old woman is referred to the Rheumatology Clinic having suffered a right Colle's fracture after slipping on ice at home. She has a history of hypertension and chronic kidney disease and is treated with ramipril, amlodipine and indapamide. A recent GFR has been measured at 32 ml/min and her DEXA scan shows a T score of -3.0.

On examination, her BP is 128/80 mmHg, pulse is 70/min and regular. Her BMI is 23. Her right wrist appears to have healed well. She is already taking calcium and vitamin D.

Which of the following is the most appropriate intervention?

A	Alendronate
B	Continue calcium and vitamin D only
C	Denosumab
D	Raloxifene
E	Teriparatide

70507

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Your answer was incorrect

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Explanation

C Denosumab

This is a RANK ligand inhibitor which reduces osteoclast activity and is an effective intervention for osteoporosis given as a subcutaneous injection once every six months

Explanation

C **Denosumab**

This is a RANK ligand inhibitor which reduces osteoclast activity and is an effective intervention for osteoporosis given as a subcutaneous injection once every six months. Like bisphosphonates it is associated with osteonecrosis of the jaw, but not other adverse events such as reflux oesophagitis. The risk of a dynamic bone disease may be less for denosumab versus bisphosphonates because it does not accumulate in bone.

A **Alendronate**

Alendronate is incorrect. This is contraindicated in patients with a GFR less than 35 ml/min, as such it should not be used here.

B **Continue calcium and vitamin D only**

Calcium and vitamin D is incorrect. This combination is ineffective as a stand-alone intervention for patients with established osteoporosis.

D **Raloxifene**

Raloxifene is incorrect. This is less effective in preventing loss of bone mineral density versus bisphosphonates or denosumab. It is also associated with increased risk of venous thromboembolism.

E **Teriparatide**

Teriparatide is incorrect. Teriparatide, a synthetic PTH

with a GFR less than 35 ml/min, as such it should not be used here.

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D Raloxifene

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E Teriparatide

Teriparatide is incorrect. Teriparatide, a synthetic PTH analogue, is usually reserved for patients with severe osteoporosis. Caution is also advised for patients with moderate or worse renal impairment.

A 40-year-old female patient asks for her cholesterol to be measured. She has a past history of polycystic ovary disease and diet-controlled diabetes mellitus. She drinks a glass of wine each night and swims most days. She is currently on the oral contraceptive pill.

Investigations:

LDL cholesterol	5.5 mmol/l
Triglycerides	2.5 mmol/l
HDL cholesterol	0.8 mmol/l

Which one of the following is the most likely cause of the low HDL cholesterol levels?

A	Alcohol
B	Exercise
C	Oral contraceptive pill
D	Diet-controlled diabetes
E	Female sex

6840

Explanation

D **Diet-controlled diabetes**

Low levels of HDL are associated with an increased risk of ischaemic heart disease. Diabetes causes low HDL and raised triglycerides. HMG CoA reductase inhibitors are used in primary and secondary prevention of coronary events. Statins are particularly considered for patients with diabetes mellitus and are recommended now for all diabetics above 40 years of age in the JBS2 guidelines. They are also used in other patients with high calculated cardiovascular risk.

E **Female sex**

Women have naturally higher HDL levels compared to men, due to higher oestrogen levels.

A **Alcohol**

Mild to moderate alcohol consumption is associated with an increase in HDL.

B **Exercise**

Exercise is an effective way of increasing HDL cholesterol levels.

C **Oral contraceptive pill**

Increased oestrogen levels, as caused by the contraceptive pill, lead to higher HDL levels.

6840

Rate this question:

A 34-year-old man attends the clinic for review. He has a microprolactinoma which was diagnosed after he presented with erectile dysfunction and loss of libido. He was started on cabergoline, but suffered an episode of pericarditis.

Which of the following medications should he avoid because of the previous pericarditis?

A Aspirin
B Fluoxetine
C Pergolide
D Sumatriptan
E Ondansetron

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Explanation

C **Pergolide**

Both pergolide and cabergoline may be associated with pericarditis, cardiac valve regurgitation, pericardial effusion and pulmonary hypertension. Dopamine agonists are the treatment of choice for microprolactinoma, and ropinirole may be an appropriate alternative in this case, but otherwise surgery would be the next most appropriate step.

A **Aspirin**

Aspirin is recommended for treatment of pericarditis after ST-elevation myocardial infarction.

B **Fluoxetine**

Fluoxetine, also known by various trade names, is an antidepressant of the selective serotonin reuptake inhibitor (SSRI) class. It is used for the treatment of major depressive disorder, obsessive-compulsive disorder (OCD), bulimia nervosa, panic disorder and premenstrual dysphoric disorder.

Its use should also be avoided in those receiving other serotonergic drugs such as monoamine oxidase inhibitors, tricyclic antidepressants, methamphetamine, 3,4-methylenedioxymethamphetamine (MDMA; Ecstasy), triptans, buspirone, serotonin-norepinephrine reuptake inhibitors and other SSRIs, due to the potential for serotonin syndrome to develop as a result.

D **Sumatriptan**

It is used in the management of migraine or cluster headaches. Serious cardiac events, including some that have been fatal, have occurred following the use of

methylenedioxymethamphetamine (MDMA; Ecstasy), triptans, buspirone, serotonin-norepinephrine reuptake inhibitors and other SSRIs, due to the potential for serotonin syndrome to develop as a result.

D Sumatriptan

It is used in the management of migraine or cluster headaches. Serious cardiac events, including some that have been fatal, have occurred following the use of sumatriptan injection or tablets. Events reported have included coronary artery vasospasm, transient myocardial ischemia, myocardial infarction, ventricular tachycardia and ventricular fibrillation (V-Fib)

E Ondansetron

Ondansetron is a medication used to prevent nausea and vomiting caused by cancer chemotherapy, radiation therapy or surgery. It is also useful in gastroenteritis. It has little effect on vomiting caused by motion sickness. It can cause QT prolongation.

A 54-year-old man with type 1 diabetes presents for his annual review. Over the past couple of years, he has suffered problems with early satiety, indigestion and regurgitation of food matter but has not lost weight, and now requests investigations.

His diabetes is relatively well controlled, with a recent HbA1c of 57.38 mmol/mol (7.4%), his Hb is normal at 13.0 g/dl and his ESR is 13 mm/h. You note that he does have a postural drop of 35 mmHg on blood pressure measurement.

Which of the following actions is most useful with respect to his GI symptoms?

A Oesophageal pH monitoring

B Isotope gastric motility studies

C Upper GI endoscopy

D Trial of anti-acids

E Trial of proton pump inhibitor therapy

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Your answer was correct

A	Oesophageal pH monitoring
B	Isotope gastric motility studies
C	Upper GI endoscopy
D	Trial of anti-acids
E	Trial of proton pump inhibitor therapy

Explanation

B Isotope gastric motility studies

This patient likely has diabetic autonomic neuropathy, manifest in postural hypotension and delayed gastric emptying. Isotope gastric motility studies are the most appropriate way to assess gastric emptying, and treatments involve prokinetic agents such as domperidone, metoclopramide or erythromycin, although response to treatment is generally poor. Treatment of postural hypotension involves mechanical measures such as

Explanation

B Isotope gastric motility studies

This patient likely has diabetic autonomic neuropathy, manifest in postural hypotension and delayed gastric emptying. Isotope gastric motility studies are the most appropriate way to assess gastric emptying, and treatments involve prokinetic agents such as domperidone, metoclopramide or erythromycin, although response to treatment is generally poor. Treatment of postural hypotension involves mechanical measures such as bedhead elevation and wearing of support stockings. Intake of sodium chloride should be adequate, and fludrocortisone may be added starting at a dose of 50 µg/day, increased up to 400 µg as required. Diuretics, vasodilators and tricyclic antidepressants may exacerbate the condition and, for this reason, review of current medications that may exacerbate postural hypotension is important before commencing further therapy.

A Oesophageal pH monitoring

Oesophageal pH monitoring is most useful for evaluating symptoms of oesophageal reflux disease. Although there is a degree of reflux here, it's driven by dysmotility rather than by excess acid production.

C Upper GI endoscopy

Upper GI endoscopy is required as part of the work-up symptoms of indigestion in this patient, but won't reveal the underlying cause.

D Trial of anti-acids

Although anti-acids may offer some relief, given dysmotility is the primary problem, they are unlikely to

A 56-year-old man with a history of hypothyroidism managed with thyroxine replacement comes to the clinic for review. He has increasing tiredness. Other symptoms of note include depression and one episode of renal colic.

Investigations:

TSH	2.1 U/l (<0.5-4.5)
Hb	11.3 g/dl
WCC	4.2 x10^9/l
Na^+	139 x10^9/l
K^+	5.4 mmol/l
Creatinine	237 μmol/l
Ca^{++}	2.10 mmol/l (2.2-2.6)
1,25 dihydroxycholecalciferol	10 ng/l (20-50)
PTH	13 pmol/l (1-6)

Which of the following is the most appropriate therapy for him?

A Alphacalcidol

B Ergocalciferol

C Cinacalcet

D Sevelamer

E Parathyroidectomy

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WCC	4.2 x10⁹/l
Na⁺	139 x10⁹/l
K⁺	5.4 mmol/l
Creatinine	237 µmol/l
Ca⁺⁺	2.10 mmol/l (2.2-2.6)
1,25 dihydroxycholecalciferol	10 ng/l (20-50)
PTH	13 pmol/l (1-6)

Which of the following is the most appropriate therapy for him?

Your answer was correct

A Alphacalcidol

B Ergocalciferol

C Cinacalcet

D Sevelamer

E Parathyroidectomy

Explanation

A Alphacalcidol

This man has a PTH just above twice the normal level and chronic kidney disease. Management of his secondary hyperparathyroidism involves appropriate vitamin D replacement, normally given twice per week. Surgery may be considered if parathyroidism does not respond to

E Parathyroidectomy

Explanation

A Alphacalcidol

This man has a PTH just above twice the normal level and chronic kidney disease. Management of his secondary hyperparathyroidism involves appropriate vitamin D replacement, normally given twice per week. Surgery may be considered if parathyroidism does not respond to medical management.

B Ergocalciferol

This is less effective in managing hyperparathyroidism, because of defective hydroxylation of vitamin D in the kidney.

C Cinacalcet

Cinacalcet is only used for managing symptomatic hyperparathyroidism in patients with chronic kidney disease on renal replacement therapy or in those who are unable to undergo surgery.

D Sevelamer

Sevelamer is a phosphate binder used for managing hyperphosphataemia in patients with chronic renal impairment.

E Parathyroidectomy

Parathyroidectomy is the next step in patients who fail to respond to medical intervention for hyperparathyroidism.

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A 58-year-old woman is admitted to the Admissions Unit. She has a long history of type 2 diabetes. Her foot is hot and swollen, and she has been suffering vague bony pains in it over the past few months. There is no history of trauma and no obvious skin break. Fundoscopy reveals diabetic retinopathy, and examination of her lower limbs reveals absent sensation to vibration and pinprick to the knees. Her blood pressure is 155/95 mmHg. HbA1c is 65 mmol/mol.

A photo and X-ray of her foot are shown below.

What is your next management step?

A	IV flucloxacillin and metronidazole
B	Lower limb venous ultrasound scan

What is your next management step?

A IV flucloxacillin and metronidazole

B Lower limb venous ultrasound scan

C Below-knee cast

D Oral clindamycin

E Class 3 compression stockings

Explanation

C Below-knee cast

This subacute presentation, with joint swelling and chronic joint pains against a background of long-standing and poorly controlled diabetes, suggests possible Charcot's, in this case of the talo-navicular joint. Non-weight bearing in a cast is the intervention of choice. Bisphosphonates may also be of value in reducing bone turnover.

E Class 3 compression stockings

Compression stockings are used in the treatment of chronic venous insufficiency. The picture reveals no evidence of venous ulceration to suggest they are of value here.

A IV flucloxacillin and metronidazole

Co-amoxiclav is the usual preferred option for diabetic soft tissue infection, because it has wide coverage of both aerobes and anaerobes, and the subacute history is more consistent with Charcot's, especially as there is no obvious potential site of infection.

B Lower limb venous ultrasound scan

The localised swelling around the ankle joint is more consistent with bony deformity than a venous thrombosis.

D Oral clindamycin

Clindamycin is optimal oral therapy for osteomyelitis, although it is associated with high risk of development of

chronic venous insufficiency. The picture reveals no evidence of venous ulceration to suggest they are of value here.

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B Lower limb venous ultrasound scan

The localised swelling around the ankle joint is more consistent with bony deformity than a venous thrombosis.

D Oral clindamycin

Clindamycin is optimal oral therapy for osteomyelitis, although it is associated with high risk of development of pseudomembranous colitis.

A 38-year-old man presents with ulcerated lesions over both shins. They are erythematous around the edges, but the centres are yellowed and atrophic with signs of ulceration. He has a history of type 1 diabetes mellitus. He has recently lost his job and has poor standards of personal care. He is on multiple daily insulin injections (insulin detemir [rDNA origin] injection as basal insulin and insulin aspart with his meals) and his diabetes control is poor (HbA1c: 79 mmol/mol).

Which of the following represents the most appropriate treatment to the non-atrophied areas?

A	Topical steroids
B	Oral prednisolone
C	Azathioprine
D	Flucloxacillin
E	Compression bandaging

7607

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A 38-year-old man presents with ulcerated lesions over both shins. They are erythematous around the edges, but the centres are yellowed and atrophic with signs of ulceration. He has a history of type 1 diabetes mellitus. He has recently lost his job and has poor standards of personal care. He is on multiple daily insulin injections (insulin detemir [rDNA origin] injection as basal insulin and insulin aspart with his meals) and his diabetes control is poor (HbA1c: 79 mmol/mol).

Which of the following represents the most appropriate treatment to the non-atrophied areas?

Your answer was correct

A Topical steroids
B Oral prednisolone
C Azathioprine
D Flucloxacillin
E Compression bandaging

Explanation

A Topical steroids

Necrobiosis lipoidica is seen in 0.3–1% of patients with diabetes and is more common in females. Around 40–60% of patients with necrobiosis lipoidica have diabetes, and the condition may predate the development of abnormal blood sugar. Treatments with topical steroids, injectable

Explanation

A Topical steroids

Necrobiosis lipoidica is seen in 0.3–1% of patients with diabetes and is more common in females. Around 40–60% of patients with necrobiosis lipoidica have diabetes, and the condition may predate the development of abnormal blood sugar. Treatments with topical steroids, injectable steroids, skin grafting and camouflage creams have been used as therapies. In practice, however, the areas of already atrophied skin respond poorly to steroid therapy.

B Oral prednisolone

Oral prednisolone would deteriorate his diabetes control even further.

C Azathioprine

Azathioprine, sold under the brand name is an immunosuppressive medication which is used in rheumatoid arthritis, Crohn's disease and ulcerative colitis, and in kidney transplants to prevent rejection. Common side effects include bone marrow suppression and vomiting. Bone marrow suppression is especially common in people with a genetic deficiency of the enzyme thiopurine S-methyltransferase. Other serious risk factors include an increased risk of lymphoma. Azathioprine is in the purine analogue and anti-metabolite family of medication. It works via 6-thioguanine to disrupt the synthesis of RNA and DNA by cells.

D Flucloxacillin

This is mainly used in cases of cellulitis which would manifest with an area of erythema accompanied usually by tenderness and increased skin temperature.

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D	Flucloxacillin

This is mainly used in cases of cellulitis which would manifest with an area of erythema accompanied usually by tenderness and increased skin temperature.

E	Compression bandaging

This is used for the treatment of venous ulcers. A venous ulcer tends to occur on the medial side of the leg, typically around the medial malleolus, and is usually shallow with irregular, sloping edges. Venous ulcers are typically 'wet' with a moderate to heavy exudate. The skin surrounding a venous ulcer may be oedematous, and there may be evidence of varicose veins.

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A collapsed patient is admitted to A&E. In his possession are empty prednisolone boxes, and he has a steroid user card. He has obvious rheumatoid features on examination and unilateral consolidation on his chest X-ray. He is given intravenous fluids and broad-spectrum antibiotics. His BP is 100/60 mmHg lying and 75/40 standing, with a pulse of 95/min.

Investigations:

Sodium	131 mmol/l
Potassium	5.7 mmol/l
Urea	7.8 mmol/l
Creatinine	105 umol/l

Which one of the following would be the most useful addition to the current management?

A	Thyroid function test before giving steroids
B	Oral prednisolone 40 mg
C	IV hydrocortisone 100 mg
D	Oral prednisolone 20 mg and fludrocortisone 50 µg
E	Oral prednisolone 40 mg and fludrocortisone 50 µg

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C IV hydrocortisone 100 mg

The history of rheumatoid arthritis and steroid user card suggests the patient is on steroids. The fact that he has empty boxes in his possession may mean that he has run out of steroids. As he currently has a pneumonia, his need for steroids will be higher than normal. These should be given IV to ensure they are absorbed.

A Thyroid function test before giving steroids

It is important not to delay the administration of steroids as the patient is systemically unwell and may have missed a number of doses.

B Oral prednisolone 40 mg

Oral formulations of steroids are inadequately absorbed and therefore not appropriate in patients who are systemically unwell.

D Oral prednisolone 20 mg and fludrocortisone 50 µg

Fludrocortisone is often used in the treatment of Addison's disease at a dose of 50-300 µg. There is no indication that this patient has Addison's. Even in new diagnoses of Addison's, mineralocorticoid replacement is not necessary in the acute phase. This is because high-dose hydrocortisone has a mineralocorticoid effect.

E Oral prednisolone 40 mg and fludrocortisone 50 µg

Fludrocortisone is often used in the treatment of Addison's disease. There is no indication that this patient has

A 55-year-old man with a 5-year history of type 2 diabetes presents for review. He currently takes metformin 2 g/day and gliclazide 160 mg/day, and a recent HbA1c was 68.31 mmol/mol (8.4%). His complaint is of weight loss, burning proximal muscle pain and weakness. On examination there is left-sided quadriceps wasting.

Which of the following treatments is most appropriate for his diabetes and associated complications?

A Increased metformin dose
B Increased gliclazide dose
C Transition to insulin therapy
D Amytriptyline
E Tramadol

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Explanation

C Transition to insulin therapy

The aetiology of diabetic amyotrophy, the diagnosis here, is unknown. It affects the lumbar sacral plexus lower motor neurones. Transition to insulin therapy is recommended because it is likely to improve his glucose control, and may impact progression of neuropathy. Recovery of diabetic amyotrophy happens over 3-4 months, but only 50% achieve complete recovery. Trials of immunomodulatory agents in managing the condition have been disappointing.

A Increased metformin dose

There is little evidence that increasing metformin dose above 2 g/day has any additional impact on glycaemic control.

B Increased gliclazide dose

Like metformin, the dose response curve for gliclazide is relatively flat at high doses. The increment in glucose control between 160 and 320 mg/day is therefore small.

D Amytriptyline

Amitriptyline, although effective in treating neuropathic pain, won't impact on progression of neuropathy.

E Tramadol

Opiate-based analgesics aren't recommended for the treatment of diabetic neuropathy because they are less effective than agents such as tricyclic anti-depressants, and are addictive.

A 73-year-old man comes to the clinic as a referral from his GP, having presented with severe headaches and ischaemic pain in his fingers and toes. The pain increases with heat, and improves if he keeps his hands and feet cold. Most striking is that just taking a few aspirin tablets seemed to improve things for a significant time period. He has a past medical history of hypertension for which he takes ramipril. On examination his BP is 142/87 mmHg and the remainder of the physical examination is unremarkable.

Investigations (sent by the GP):

Hb	12.3 g/dl
WCC	8.1 x10^9/l
PLT	821 x10^9/l
Na^+	140 mmol/l
K^+	6.2 mmol/l
Creatinine	130 µmol/l

Which of the following is the most appropriate way to deal with his hyperkalaemia?

A	Stop the ramipril
B	Start a small dose of furosemide
C	Re-check a fresh sample at the hospital
D	Reassure the biochemistry department that it is related to the high platelet count
E	Start calcium resonium

Hb	12.3 g/dl
WCC	8.1 x10⁹/l
PLT	821 x10⁹/l
Na⁺	140 mmol/l
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Your answer was correct

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B	Start a small dose of furosemide
C	Re-check a fresh sample at the hospital
D	Reassure the biochemistry department that it is related to the high platelet count
E	Start calcium resonium

Explanation

C Re-check a fresh sample at the hospital

Pseudohyperkalaemia is known to be associated with essential thrombocytosis, the most likely diagnosis here. It is also likely that the sample taken at the GP surgery had spent a considerable amount of time in transit, allowing for in-tube cell lysis to further increase potassium levels. As

C Re-check a fresh sample at the hospital

Pseudohyperkalaemia is known to be associated with essential thrombocytosis, the most likely diagnosis here. It is also likely that the sample taken at the GP surgery had spent a considerable amount of time in transit, allowing for in-tube cell lysis to further increase potassium levels. As such, it is sensible to re-check a sample.

A Stop the ramipril

Given that the creatinine is almost in the normal range, it's most likely the elevated potassium is due to pseudohyperkalaemia; as such, the potassium must be re-checked before considering treatment discontinuation.

B Start a small dose of furosemide

This may lead to volume depletion and actually increase the risk of a thrombotic event related to the high platelet count.

D Reassure the biochemistry department that it is related to the high platelet count

It must be re-checked at the hospital to exclude significant hyperkalaemia.

E Start calcium resonium

This should be started for hyperkalaemia either in the acute setting or where other options for reducing hyperkalaemia in the chronic setting, such as discontinuation of other therapies, have been excluded.

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A 46-year-old publican presents to the Emergency room with symptoms of thirst and lethargy. He had been discharged some 2 weeks earlier after his 3rd episode of acute pancreatitis in the past year. He admits to alcoholism, drinking 3 bottles of whisky and at least 30 pints of beer each week. On examination he looks dehydrated. His BP is 125/70 mmHg, and his pulse is 92/min, his BMI is 21. Respiratory, cardiovascular and abdominal examinations are unremarkable.

Investigations:

Hb	12.1 g/dl
WCC	9.1 x10^9/l
PLT	232 x10^9/l
Na^+	142 mmol/l
K^+	5.1 mmol/l
Creatinine	185 µmol/l
Glucose	26.1 mmol/l
Amylase	400U/L (60-180)
Urine ketones	-ve

He agrees to begin a detox regime.

Which of the following is the most appropriate way to manage his diabetes?

A Metformin

B Glicazide

C Acarbose

D Sitagliptin

Respiratory, cardiovascular and abdominal examinations are unremarkable.

Investigations:

Hb	12.1 g/dl
WCC	9.1 x10⁹/l
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Which of the following is the most appropriate way to manage his diabetes?

A	Metformin
B	Glicazide
C	Acarbose
D	Sitagliptin
E	Insulin

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Na⁺	142 mmol/l
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Your answer was correct

A	Metformin
B	Glicazide
C	Acarbose
D	Sitagliptin
E	Insulin

Explanation

E	Insulin

Diabetes associated with pancreatitis is due to damage to the endocrine pancreas and associated lack of insulin. This

E Insulin

Diabetes associated with pancreatitis is due to damage to the endocrine pancreas and associated lack of insulin. This pathophysiology is consistent with the patient's presentation: he is thin, with symptoms of insulinopaenia. As such, exogenous insulin replacement is the only appropriate intervention here.

A Metformin

Metformin reduces hepatic glucose output and is therefore expected to have no significant impact on blood glucose levels in this patient.

B Glicazide

Although gliclazide will have a stimulatory effect on remaining endogenous insulin production, it's unlikely to achieve blood glucose control.

C Acarbose

Acarbose reduces absorption of complex carbohydrates from the gut. In this case it won't impact on glucose control and will actually worsen diarrhoea.

D Sitagliptin

Sitagliptin reduces degradation of endogenous incretins; these, however, have little effect on increasing insulin production from a failing pancreas.

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A 42-year-old man presents to the GP with lethargy and depression. He is in relationship difficulties, as his partner is having an affair and he admits to impotence over the last 2 years. Other past history of note includes hypertension which is managed with amlodipine 5mg daily. On examination his BP is 145/82 mmHg, he is overweight with a BMI of 29. You note that he is quite tanned but tells you he had taken the children on holiday to the beach during the previous week.

Investigations;

Hb	13.4 g/dl
WCC	7.9 x10⁹/l
PLT	204 x10⁹/l
Na^+	139 mmol/l
K^+	4.5 mmol/l
Creatinine	130 µmol/l
ALT	135 U/l
TSH	Low
T4	Just below limit of normal range
Glucose	8.9 mmol/l (fasting)

Which of the following investigations is most likely to confirm the diagnosis?

A	Testosterone
B	Morning cortisol
C	Growth hormone

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Investigations;

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ALT	135 U/l
TSH	Low
T4	Just below limit of normal range
Glucose	8.9 mmol/l (fasting)

Which of the following investigations is most likely to confirm the diagnosis?

A	Testosterone
B	Morning cortisol
C	Growth hormone
D	Transferrin saturation
E	Ferritin

D Transferrin saturation

The constellation of diabetes, increased skin pigmentation with evidence of pituitary dysfunction as evidenced by pituitary dependent hypothyroidism, and impotence, against a background of abnormal LFTs raises the possibility of haemochromatosis. Transferrin saturation is the optimal blood test to support the diagnosis, as ferritin may also be elevated in a number of other chronic liver conditions. HFE gene analysis is the mainstay with respect to confirming the diagnosis, with liver biopsy useful in determining the degree of cirrhosis associated with haemochromatosis.

A Testosterone

Testosterone may well be reduced, but measuring it is unlikely to reveal the underlying cause.

B Morning cortisol

Morning cortisol may be low due to pituitary dysfunction and failure of ACTH production, although this is less likely given that both sodium and potassium are within the normal range.

C Growth hormone

Growth hormone may be reduced due to pituitary dysfunction, although again, measuring it is unlikely to reveal the underlying cause.

E Ferritin

Although ferritin is elevated in haemochromatosis, it is also an acute phase protein and is therefore also elevated with other causes of hepatic dysfunction.

A 20-year-old woman comes to the clinic complaining of excess facial hair and acne.

On examination, her BMI is elevated at 29 kg/m². Her BP is raised at 155/92 mmHg and her pulse is 80/min and regular. You notice excess hair around her beard line, upper chest and lower abdomen. There are no purple striae on abdominal examination. The examination of external genitalia is normal.

On further questioning, she tells you that her periods are irregular, only occurring every 3 months, and they are heavy when they do occur.

Which one of the following would be an appropriate initial investigation?

A Plasma ACTH

B MRI pituitary

C Testosterone levels

D High-dose dexamethasone suppression test

E 17-hydroxyprogesterone

C Testosterone levels

The suspected diagnosis here is polycystic ovarian syndrome (PCOS). According to the Rotterdam Consensus, two of the following three criteria are required for the diagnosis of the PCOS:

- oligo-/anovulation
- hyperandrogenism
  - clinical (hirsutism or less commonly male pattern alopecia) or
  - biochemical (raised free androgen index or free testosterone)
- polycystic ovaries on ultrasound.

A Plasma ACTH

There is no clear clinical evidence of cortisol excess in this scenario. Even if Cushing syndrome was suspected, an overnight dexamethasone suppression test or high-dose dexamethasone suppression test would be the initial investigation in order to establish the presence of hypercortisolism. If hypercortisolim was confirmed, a suppressed ACTH would point towards an adrenal cause whereas raised ACTH would indicate a pituitary cause.

B MRI pituitary

This would be useful only if Cushing syndrome was confirmed via overnight dexamethasone or high-dose dexamethasone suppression test and a central cause for hypercortisolism was suspected.

D High-dose dexamethasone suppression test

This is used when Cushing syndrome is clinically suspected

confirmed via overnight dexamethasone or high-dose dexamethasone suppression test and a central cause for hypercortisolism was suspected.

D	High-dose dexamethasone suppression test

This is used when Cushing syndrome is clinically suspected and the overnight dexamethasone suppression test results are equivocal.

E	17-hydroxyprogesterone

This is usually raised (>1000 ng/dl) in cases of congenital adrenal hyperplasia (CAH) due to 21-hydroxylase deficiency. Females with severe CAH due to deficiencies of 21-hydroxylase, 11-beta-hydroxylase or 3-beta-hydroxysteroid dehydrogenase have ambiguous genitalia at birth (classic virilising adrenal hyperplasia). Females with mild 21-hydroxylase deficiency are identified later in childhood because of precocious pubic hair, clitoromegaly or both, often accompanied by accelerated growth and skeletal maturation (simple virilising adrenal hyperplasia). Females with still milder deficiencies of 21-hydroxylase or 3-beta-hydroxysteroid dehydrogenase activity may present in adolescence or adulthood with oligomenorrhoea, hirsutism and/or infertility (non-classic adrenal hyperplasia).

An 18-year-old man has been seen in the clinic for recurrent oral candida infections over the past year. He was previously fit and well. HIV antibody and polymerase chain reaction tests are negative.

In terms of his biochemical profile, the patient has a normal oral glucose tolerance test, normal urea and electrolytes and normal TSH.

His bone profile results:

Corr. Ca^{++}	2.01 mmol/l (2.2-2.6 mmol/l)
Phosphate	1.65 mmol/l (0.8-1.5 mmol/l)
PTH	1.0 pmol/l (1.5-7.6 pmol/l)
Vitamin D	23 nmol/l (< 25 nmol/l indicates deficiency)

Which of the following is the most likely pathology?

A	Type 2 polyglandular syndrome
B	Secondary hyperparathyroidism
C	Primary hyperparathyroidism
D	Type 1 polyglandular autoimmune syndrome
E	Hyperthyroidism

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C	Primary hyperparathyroidism
D	Type 1 polyglandular autoimmune syndrome
E	Hyperthyroidism

Explanation

D Type 1 polyglandular autoimmune syndrome

Explanation

D Type 1 polyglandular autoimmune syndrome

Type 1 polyglandular autoimmune syndrome comprises mucocutaneous candidiasis, chronic hypoparathyroidism and autoimmune hypoadrenalism. The three major components tend to present in the chronological order of candidiasis, followed by hypoparathyroidism, followed by adrenal insufficiency. Hypoparathyroidism chronologically follows the mucocutaneous candidiasis and presents with hypocalcaemia, hyperphosphataemia and low parathyroid hormone. Other autoimmune pathologies associated with the condition include type 1 diabetes, pernicious anaemia, hypothyroidism and vitiligo. Treatment includes antifungals, vitamin D, calcium and glucocorticoid replacement.

A Type 2 polyglandular syndrome

Type 2 polyglandular syndrome comprises autoimmune hypoadrenalism, in combination with thyroid autoimmune disease (Hashimoto's thyroiditis or Graves' disease) and/or type 1 diabetes mellitus. Primary hypogonadism, myasthenia gravis and coeliac disease are also commonly seen in this syndrome.

B Secondary hyperparathyroidism

The biochemical profile would have been different in this condition, with a low Vitamin D, hypocalcaemia and a high PTH.

C Primary hyperparathyroidism

This is not part of the polygandular autoimmune syndromes and manifests with hypercalcaemia, hypophosphataemia and normal/high parathyroid hormone

An 18-year-old woman has been referred to the clinic by her GP. She attends with her mother, who is concerned that she has become irritable, depressed and withdrawn over the past few weeks after splitting with her boyfriend. She is currently studying for her A-levels. Her mother takes thyroxine.

Thyroid function tests are shown below:

TSH	2.1 mU/l (0.4-5)
Total T4	85 nmol/l (58-174)
Total T3	3.31 pmol/l (1.07-3.18)
Free T4	14 nmol/l (10-22)
Free T3	6.1 pmol/l (5-10)

Which of the following diagnoses fits best with this clinical and biochemical picture?

A	T3 thyrotoxicosis
B	Sick euthyroid syndrome
C	Pregnancy
D	Grave's disease
E	Ectopic thyroid hormone administration

C Pregnancy

This woman has become irritable and depressed with a change of behaviour over the past few weeks. Excess oestrogen, clofibrate and chronic heroin abuse are known to increase thyroid hormone-binding proteins. This would result in an increase in total T3 and T4, with normal free hormone levels. For this reason, total thyroid hormone levels are often misleading and most laboratories now measure free hormone concentration. In this case the thyroid screen is of course normal with only the total T3 just above the normal range. Glucocorticoids, phenytoin, androgens and carbamazepine all result in a reduction in thyroid hormone binding proteins.

E Ectopic thyroid hormone administration

Ectopic thyroid hormone administration results in suppression of TSH and elevated free thyroid hormones, in contrast to the clinical picture seen here.

A T3 thyrotoxicosis

Although total T3 is above the upper limit of normal, free T3 lies within the normal range, suggesting an increase in thyroid-binding globulin, not T3 thyrotoxicosis.

B Sick euthyroid syndrome

Sick euthyroid syndrome occurs when thyroid hormone levels fall at the time of a severe intercurrent illness.

D Grave's disease

Graves' disease is associated with excess free thyroid hormones and suppression of TSH.

A 78-year-old woman signs on with a new general practitioner (GP) and has some routine blood tests. It is after these blood tests that the GP notices a raised corrected calcium level of 2.80 mmol/l and a raised parathyroid hormone (PTH) at 9 pmol/l. There is no history of renal stones, fractures or psychiatric disturbance. Other renal and liver function testing is unremarkable, full blood count is normal and there is no suspicion of underlying malignancy. Bone mineral density is at the lower end of the normal range.

Which is likely to be the most appropriate way to manage this woman?

A	Neck exploration for parathyroidectomy
B	Hormone replacement therapy
C	Observation
D	Calcium and vitamin D therapy
E	Oral phosphate

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B Hormone replacement therapy

C Observation

D Calcium and vitamin D therapy

E Oral phosphate

Explanation

C Observation

Definite indications for surgery in hyperparathyroidism, the most likely diagnosis here (American National Institutes of Health consensus) include markedly elevated corrected

C Observation

Definite indications for surgery in hyperparathyroidism, the most likely diagnosis here (American National Institutes of Health consensus) include markedly elevated corrected serum calcium (>3 mmol/l), previous marked hypercalcaemic episode, impaired renal function, renal stones, nephrocalcinosis, substantially elevated urinary calcium and reduced bone mineral density. Patients with hyperparathyroidism kept under observation require annual plasma calcium, renal function and blood pressure checks, repeat bone mineral density check every 2–3 years and renal ultrasound scan. Any significant deterioration in the clinical condition would be an indication for surgery. Surgery should be carried out by a surgeon who does more than 20 parathyroidectomies per year. In parathyroid adenoma the affected gland should be removed; hyperplasia may be managed with partial parathyroidectomy or complete parathyroidectomy, with medical treatment for hypoparathyroidism.

A Neck exploration for parathyroidectomy

In this scenario the patient has mild hypercalcaemia, with no symptoms and no end-organ damage (i.e. nephrocalcinosis, osteoporosis), and therefore there is no indication for surgical intervention.

B Hormone replacement therapy

Common clinical indications to commence menopausal hormone replacement therapy are:

- to relieve vasomotor symptoms
- to improve urogenital symptoms (long-term therapy is required)
- to prevent osteoporosis.

Oestrogen therapy in postmenopausal women has been shown to cause a small reduction in serum calcium (up to 0.25 mmol/l) without a change in parathyroid hormone. Oestrogen also has beneficial effects on lumbar spine and femoral neck bone mineral density. However, due to risks associated with oestrogen replacement, it should not be used for the sole purpose of treating primary hyperparathyroidism.

D	Calcium and vitamin D therapy

Calcium replacement is not indicated in primary hyperparathyroidism, since it would deteriorate the hypercalcaemia. Vitamin D can be administered cautiously and at a lower dose in the context of deficiency.

E	Oral phosphate

Primary hyperparathyroidism can cause mild hypophosphataemia through increased phosphaturia. Phosphate replacement therapy is not indicated.

An 18-year-old hirsute female, obese patient is referred to your clinic with a prolactin of 850 mU/l (90–520), and no menses for the past 3 months. She has a blood pressure of 125/82 mmHg, and her pulse is 70/min and regular. Her BMI is 27.

What is the most important next step?

A Serum 17-hydroxy-progesterone levels

B Pituitary MRI

C Serum testosterone levels

D Serum FSH and LH levels

E Pregnancy testing

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E Pregnancy testing

The first test to do when seeing anyone with hyperprolactinaemia is to exclude pregnancy, as it is the most common cause. Obesity and hirsutism are common and may not indicate any underlying pathology. Prolactin is normally <450 mU/l, but can rise tenfold in pregnancy. A serum prolactin of >3000 mU/l is suggestive of a tumour. However, treatment with dopamine antagonists can give a prolactin of 900–3600 mU/l.

A Serum 17-hydroxy-progesterone levels

Congenital adrenal hyperplasia is associated with hirsutism, although given that the patient has had a normal menstrual cycle until 3 months earlier, pregnancy is the more likely cause of her presentation here.

B Pituitary MRI

The prolactin level seen here is not particularly elevated, making a tumour less likely as the cause of her symptoms. Large pituitary tumours can compress or interrupt the pituitary stalk, leading to prolactin in the range of 900–6000 mU/l. However, macroprolactinomas are generally defined as a prolactin of >6000 mU/l. First-line therapy for prolactinoma is with dopamine agonists such as bromocriptine or cabergoline.

C Serum testosterone levels

Given that this patients symptoms of amenorrhoea are recent, pregnancy is more likely than an alternative diagnosis such as polycystic ovarian syndrome.

D Serum FSH and LH levels

Calculation of the LH:FSH ratio is most useful in the

A 40-year-old woman is referred to the Endocrine Clinic with diabetes mellitus and hypertension. She tells you that she has gained weight by 23 kg over the past 18 months and her blood glucose is not controlled (recent HbA1c is 65 mmol/mol), despite taking metformin, liraglutide and long-acting insulin in combination. Her blood pressure is 155/95 mmHg.

She has also developed hirsutism and acne, as seen in the picture below.

Which of the following is the most useful next investigation?

A	Insulin-like growth factor 1 (IGF-1)
B	Oral glucose tolerance test with growth hormone measurement
C	Thyroid-stimulating hormone (TSH)
D	24-hour urinary metanephrines
E	24-hour urinary free cortisol

Explanation

E	24-hour urinary free cortisol

The suspicion in a patient with rapid weight gain, hirsuitism, acne, impaired glucose tolerance and hypertension is that they have developed Cushing syndrome. Adrenal causes of Cushing syndrome versus a pituitary adenoma may be associated with a greater degree of hyperandrogenism, and hence with more marked hirsutism and acne in women. The patient can be given a urine bottle when she leaves the clinic. Hence 24-hour urinary free cortisol represents an ideal initial screening test for Cushing syndrome.

A	Insulin-like growth factor 1 (IGF-1)

IGF-1 is most useful in screening for acromegaly, as it is elevated in patients with growth hormone excess. The features here fit better with Cushing syndrome, rather than a diagnosis of acromegaly.

B	Oral glucose tolerance test with growth hormone measurement

This may be used as a confirmatory test for acromegaly where growth hormone fails to be suppressed. Here the features are consistent with Cushing syndrome, rather than acromegaly.

C	Thyroid-stimulating hormone (TSH)

Hypothyroidism could account for the weight gain seen here, but it would not account for the marked deterioration in glucose tolerance, nor for the hirsutism and acne seen in this patient.

A 52-year-old woman with diabetes mellitus treated with metformin is admitted in a semi-comatose state. She is also taking ramipril, bendroflumethiazide and digoxin for atrial fibrillation and hypertension. You understand she also takes sleeping pills and codeine-based pain relief for arthritis and has recently split from her husband.

Investigations:

pH	7.41
pCO_2	3.2 kPa
pO_2	8.8 kPa
Bicarbonate	19 mmol/l
Glucose	57 mmol/l
Na^+	149 mmol/l
K^+	4.7 mmol/l
Creatinine	134 mol/l

Which of the following is the most likely diagnosis?

A	Acute kidney disease
B	Diabetic ketoacidosis
C	Hyperosmolar non-ketotic state
D	Codeine overdose
E	Lactic acidosis

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pO_2	[illegible] kPa
Bicarbonate	19 mmol/l
Glucose	57 mmol/l
Na^+	149 mmol/l
K^+	4.7 mmol/l
Creatinine	134 mol/l

Which of the following is the most likely diagnosis?

Your answer was correct

A	Acute kidney disease
B	Diabetic ketoacidosis
C	Hyperosmolar non-ketotic state
D	Codeine overdose
E	Lactic acidosis

Explanation

C Hyperosmolar non-ketotic state

This woman has markedly high blood glucose yet the pH is within the normal range, with bicarbonate of 19 mmol/l. It is likely that she is suffering from hyperosmolar hyperglycaemic state, which is characterised by profound hyperglycaemia and diuresis. Non-compliance with diet and medication may have precipitated her presentation. Treatment centres on aggressive fluid replacement with normal saline and treatment of hyperglycaemia using a

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C Hyperosmolar non-ketotic state

This woman has markedly high blood glucose yet the pH is within the normal range, with bicarbonate of 19 mmol/l. It is likely that she is suffering from hyperosmolar hyperglycaemic state, which is characterised by profound hyperglycaemia and diuresis. Non-compliance with diet and medication may have precipitated her presentation. Treatment centres on aggressive fluid replacement with normal saline, and treatment of hyperglycaemia using a fixed-rate IV insulin regimen. She may well be converted back to oral therapy once the acute metabolic disturbance is corrected.

A Acute kidney disease

The lack of significant acidosis and only mildly elevated creatinine count against acute kidney disease as the reason for her presentation here.

B Diabetic ketoacidosis

Diabetic ketoacidosis is seen in patients with type 2 diabetes but is seen very late in the disease when patients have significant insulinopaenia, and is associated with metabolic acidosis not seen here.

D Codeine overdose

Codeine overdose is associated with respiratory acidosis, not seen on the laboratory values here.

E Lactic acidosis

Although lactic acidosis is associated with metformin use, the bicarbonate of 19 effectively rules that out here.

A 48-year-old patient with type 2 diabetes has been admitted with high blood sugars and dehydration consistent with hyperosmolar hyperglycaemic state. His blood sugar has been controlled on a combination of metformin and gliclazide tablets for the last 10 years, but over the last few months his sugars have been increasingly difficult to control. He has been controlled on sliding-scale insulin during the inpatient stay. The plan is to commence twice daily 30/70 mixed insulin on discharge. He is 90 kg in weight.
He has been eating normally, and his sugars have settled down. The nurse would like you to prescribe his insulin.

Sliding scale chart. Date: (25/7, admission)

Time	Insulin U/h	Time	Insulin U/h
0100 h		0100 h	1
0200 h		0200 h	1
0300 h		0300 h	1
0400 h		0400 h	1
0500 h		0500 h	1
0600 h		0600 h	2
0700 h		0700 h	2
0800 h		0800 h	3
0900 h		0900 h	4
1000 h		1000 h	3
1100 h		1100 h	2
1200 h	2	1200 h	3
1300 h	3	1300 h	4
1400 h	4	1400 h	
1500 h	5	1500 h	

1200 h	2	1200 h	3
1300 h	3	1300 h	4
1400 h	4	1400 h	
1500 h	5	1500 h	
1600 h	3	1600 h	
1700 h	2	1700 h	
1800 h	4	1800 h	
1900 h	3	1900 h	
2000 h	4	2000 h	
2100 h	2	2100 h	
2200 h	2	2200 h	
2300 h	2	2300 h	
2400 h	1	2400 h	

What would you prescribe?

A	30/70 mix 20 units am, 10 units pm
B	30/70 mix 20 units am, 20 units pm
C	30/70 mix 20 units am, 40 units pm
D	30/70 mix 60 units am
E	30/70 mix 40 units am, 20 units pm

E 30/70 mix 40 units am, 20 units pm

Explanation

B 30/70 mix 20 units am, 20 units pm

This patient has been requiring around 60 units of insulin per 24 h, and they have type 2 diabetes. After getting over his episode of hyperosmolar hyperglycaemic state, it is likely that his insulin requirement will fall. Hence as a starting insulin dose, it would be most sensible to begin with around 2/3 of the total dose required during the episode of hyperosmolar hyperglycaemic state (40 units), split morning and evening.

E 30/70 mix 40 units am, 20 units pm

Insulin requirements as an outpatient will diminish versus those in the inpatient period. Although the patient may eventually require 60 units, it would be better to start at a dose of 40 and slowly up-titrate the dose if needed.

A 30/70 mix 20 units am, 10 units pm

This is likely to underdose on insulin, being only 50% of his inpatient requirements and is only 0.33 U/kg of body weight. Significant up-titration is therefore likely to be needed.

C 30/70 mix 20 units am, 40 units pm

Although this does represent inpatient requirements, these are likely to diminish post the acute illness and dosing 2/3 of the insulin in the evening risks significant nocturnal hypoglycaemia.

D 30/70 m

A 24-year-old woman comes to the Endocrine Clinic as she has become increasingly concerned about her weight, which has increased considerably over the past six months. She claims that her diet has remained unchanged and her physical fitness is good. She is taking topical erythromycin for her acne. A pregnancy test was negative, although she does admit to a somewhat erratic menstrual cycle. She has also noticed increased coarse, dark, hair growth on her upper lip. In the clinic, her random blood sugar measurement by finger-prick was 8.0 mmol/l.

Which investigation is most likely to point to the underlying diagnosis?

A	Urinary cortisol levels
B	TSH level
C	Oral glucose tolerance test
D	MRI brain
E	USS pelvis

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E	USS pelvis

Explanation

E USS pelvis

The history is consistent with Cushing syndrome or polycystic ovary syndrome (PCOS). If not caused by

E USS pelvis

The history is consistent with Cushing syndrome or polycystic ovary syndrome (PCOS). If not caused by pregnancy, weight gain is most likely in young people to be caused by increased fat. The causes are: increased caloric consumption disproportionate to energy expenditure; sedentary lifestyle, contributing significantly by TV watching and video gaming; endocrine disorders such as Cushing syndrome; PCOS; hypothyroidism; hypothalamic dysfunction; medications; environmental factors such as poor sleep; gut microbiota; and viruses.

Women with PCOS often present with hirsutism and menstrual irregularities. PCOS is also associated with insulin resistance. As per the Rotterdam 2003 criteria for PCOS, two out of the following three should be applicable for a diagnosis of PCOS.

- Oligo- and/or anovulation
- Clinical and/or biochemical signs of hyperandrogenism
- Polycystic ovaries (by ultrasound).

The ultrasound criterion for defining polycystic ovarian morphology is the presence of 12 or more follicles in each ovary measuring 2–9 mm in diameter and/or increased ovarian volume (>10 ml; calculated using the formula 0.5 × length × width × thickness). One ovary fitting this definition is sufficient to define PCOS.

A Urinary cortisol levels

The typical physical signs of Cushing syndrome, such as facial plethora, round face, abdominal striae, dorsal fat pad and easy bruising (ecchymoses), have not been described in this case. Screening tests would be one of the following:

A 70-year-old woman presents to the Accident and Emergency Department with thirst, polyuria and constipation. Her family also feel that she has been depressed over the last few weeks, which is unusual for her. Examination is unremarkable apart from generalised abdominal tenderness and a scar noted on the left breast from a previous lumpectomy for breast carcinoma.

Investigations:

Urea	10.0 mmol/l
Creatinine	100 µmol/l
Sodium	133 mmol/l
Potassium	4.0 mmol/l
Corrected calcium	3 .84 mmol/l
Plasma parathyroid hormone (PTH) levels	0.8 pmol/l (0.9–5.4)

Which single initial management choice would be most appropriate from the list below?

A	IV fluids
B	Oral furosemide
C	IV steroids
D	IV pamidronate
E	Denosumab

Explanation

A IV fluids

The initial diagnosis here is hypercalcaemia, which can cause severe gastrointestinal disturbance. Serum levels >3.5 mmol/l are associated with cardiac arrhythmias, coma and pancreatitis and urgent treatment is required. The low parathyroid hormone precludes parathyroid disease as a cause, and in this age group (particularly with a previous malignancy) metastatic bone disease would be high on a list of differential diagnoses.

Hypercalcaemia is often associated with severe dehydration that increases the risk of renal damage. The bisphosphonate pamidronate is the treatment of choice to reduce osteoclast activity and hence bone resorption of calcium, but should always be preceded by aggressive rehydration to prevent renal tubular damage. In the case described here, these would therefore be used as a next step following IV fluids.

B Oral furosemide

In cases of hypercalcaemia, furosemide is not routinely recommended in the Society for Endocrinology Guidelines, and it should only be given with fluid resuscitation if there is evidence of ventricular strain and pulmonary oedema.

C IV steroids

Prednisolone is used to treat hypercalcaemia associated with sarcoid.

D IV pamidronate

Pamindronate is a bisphosphonate used in the acute

A 38-year-old South-Asian man is referred to the outpatient clinic. He is currently undergoing treatment for tuberculosis, which is known to involve the renal tracts in this case. Only other past history of note is hypertension, for which he takes ramipril 10 mg daily. The infectious disease doctor has referred him to you because of some abnormal tests:

TSH	6.5 mU/l (0.4-5.0)
Free T4	8.4 pmol/l (10-22)
K^+	5.9 mmol/l
Na^+	131 mmol/l
CT scan	Adrenal calcification

His blood pressure in the clinic is actually low with a systolic of 100 mmHg.

Which of the following actions would be most appropriate in this case?

A	Commence 50 mcg thyroxine/day
B	Check anti-TPO antibodies
C	Arrange a short synacthen test
D	Commence fludrocortisone 100mcg/day
E	Check anti-adrenal antibodies

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C Arrange a short synacthen test

D Commence fludrocortisone 100mcg/day

E Check anti-adrenal antibodies

Explanation

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C Arrange a short synacthen test

This man is not acutely unwell and you have time to confirm the diagnosis of hypoadrenalism with a short synacthen test. If this is positive then you would consider commencing hydrocortisone replacement. The low BP, coupled with the low sodium and raised potassium, raise the suspicion of hypoadrenalism in this case.

A Commence 50 mcg thyroxine/day

His thyroid function tests are abnormal, but you would not commence thyroid hormone replacement at this stage. Commencing thyroxine in a patient with hypoadrenalism may precipitate a rapid deterioration in their condition. It would be most important to confirm the diagnosis of adrenal insufficiency, commence steroid hormone replacement and then re-check the thyroid function testing later.

B Check anti-TPO antibodies

Autoimmune thyroid dysfunction is commonly associated with Addison's. Although the suspicion is that this patient is hypo-adrenal, this is likely to be secondary to TB rather than an autoimmune cause.

D Commence fludrocortisone 100mcg/day

Fludrocortisone replacement is not normally required in the acute stage in the treatment of hypoadrenalism, but can be added once the dose of hydrocortisone is reduced after a few days.

E Check anti-adrenal antibodies

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D	Commence fludrocortisone 100mcg/day

Fludrocortisone replacement is not normally required in the acute stage in the treatment of hypoadrenalism, but can be added once the dose of hydrocortisone is reduced after a few days.

E	Check anti-adrenal antibodies

Adrenal antibody testing can be extremely helpful in elucidating the cause of suspected adrenal failure. The adrenal calcification suggests the possibility of tuberculosis infection, so that anti-adrenal antibodies are unlikely to be helpful here.

A 65-year-old woman who is known to suffer from chronic lymphocytic leukaemia is brought to the Emergency Department by her partner. For the past few weeks she has been suffering increasing proximal myopathy and bony pain, predominantly affecting the long bones of the arms and legs. Blood testing reveals profoundly low phosphate levels. Urine testing reveals the presence of glycosuria, although serum glucose is unremarkable.

What diagnosis fits best with this clinical picture?

A X-linked hypophosphataemia

B Tumour lysis syndrome

C Hypoparathyroidism

D Oncogenic osteomalacia

E Hyperparathyroidism

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A 65-year-old woman who is known to suffer from chronic lymphocytic leukaemia is brought to the Emergency Department by her partner. For the past few weeks she has been suffering increasing proximal myopathy and bony pain, predominantly affecting the long bones of the arms and legs. Blood testing reveals profoundly low phosphate levels. Urine testing reveals the presence of glycosuria, although serum glucose is unremarkable.

What diagnosis fits best with this clinical picture?

Your answer was correct

- A X-linked hypophosphataemia
- B Tumour lysis syndrome
- C Hypoparathyroidism
- D Oncogenic osteomalacia
- E Hyperparathyroidism

Explanation

D Oncogenic osteomalacia

Certain tumours, including mesenchymal tumours, adenocarcinomas (e.g. prostatic carcinoma) and haematological malignancies such as myeloma and chronic lymphocytic leukaemia, appear to produce a phosphaturic substance. Clinically, patients present with bone pain and/or fracture, profound proximal myopathy and severe hypophosphataemia, usually accompanied by a marked reduction in concentration of 1,25 OH vitamin D. Other

A 62-year-old man is admitted with confusion. He has a background of chronic obstructive pulmonary disease and is on home nebulisers and oxygen. His relatives have noticed increased breathlessness and vomiting, which has meant he has been unable to keep down his rescue course of prednisolone.

General examination reveals skin bruises and dry mucous membranes. Other past history of note includes treated hypothyroidism. On chest auscultation, there are bibasal inspiratory crepitations with prolonged expiratory wheeze. His pulse is 78/min, blood pressure 85/54 mmHg, temperature 37.5 °C. Chest radiography shows chronic obstructive airways changes and an electrocardiogram (ECG) shows sinus rhythm.

Investigations:

Hb	13.2 g/dl
WCC	14 × 10^9/l
PLT	470 × 10^9/l
Na^+	125 mmol/l
K^+	5.3 mmol/l
Urea	17.2 mmol/l
Creatinine	130 μmol/l
Glucose	2.8 mmol/l

You give him a bolus of IV glucose and start IV fluid replacement with normal saline.

Which of the following is the next best immediate management step?

A IV hydrocortisone

inspiratory crepitations with prolonged expiratory wheeze. His pulse is 78/min, blood pressure 85/54 mmHg, temperature 37.5 °C. Chest radiography shows chronic obstructive airways changes and an electrocardiogram (ECG) shows sinus rhythm.

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Which of the following is the next best immediate management step?

A	IV hydrocortisone
B	IV antibiotics
C	IV calcium gluconate
D	Oral calcium resonium
E	IV aminophylline

A IV hydrocortisone

Acute adrenal insufficiency in this patient is most likely due to a chest infection and prior suppression of the adrenocortical axis by exogenous steroids. Patients present with hypotension and confusion. Examination may reveal evidence of prior treatment with steroids. Biochemistry shows hyponatraemia, hyperkalaemia, hypoglycaemia and an increased urea. Treatment includes correction of hypoglycaemia, administration of glucocorticoids and adequate hydration.

B IV antibiotics

Whilst these may be appropriate, antibiotics should follow corticosteroids in this case in terms of urgency given the significant electrolyte disturbance and hypotension.

C IV calcium gluconate

Potassium is towards the upper end of the normal range and is likely to fall rapidly as a result of rehydration and initiation of corticosteroid therapy.

D Oral calcium resonium

Calcium resonium is unpleasant to take and is not required here, because potassium will almost certainly fall once fluid replacement and steroid therapy is initiated. Its main use is in the management of hyperkalaemia occurring as a result of acute on chronic kidney disease.

E IV aminophylline

IV aminophylline use is not encouraged in acute exacerbations of COPD because of the high risk of atrial arrhythmias; it may be used in cases where other options

Rana Alnasser's screen

A 54-year-old Asian man with a 7-year history of type 2 diabetes has been diagnosed with background diabetic retinopathy at his annual review. He was also recently admitted to hospital with an episode of cardiac failure after an anterior myocardial infarction. He is taking gliclazide 80 mg bd as he failed to tolerate metformin. His BMI is elevated at 35. Recent Hb A_{1C} was 7.1%, blood pressure (BP) 154/85, proteinuria +; and total cholesterol 5.4 mmol/l with HDL 0.7 mmol/l.

You are considering switching his blood glucose-lowering medication because of recent weight gain.

Which of the following is the most appropriate switch therapy with respect to overall cardiovascular risk in this patient?

A	Insulin
B	Empagliflozin
C	Lixisenatid
D	Saxagliptin
E	Sitagliptin

6544

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Explanation

B Empagliflozin

Blood glucose-lowering medications in the GLP-1 and SGLT2 inhibitor class have been shown to reduce the risk of major adverse cardiovascular events (MACE). As such, empagliflozin, which causes glucose excretion and can

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Explanation

B Empagliflozin

Blood glucose-lowering medications in the GLP-1 and SGLT2 inhibitor class have been shown to reduce the risk of major adverse cardiovascular events (MACE). As such, empagliflozin, which causes glucose excretion and can have positive effects on weight, reduces cardiovascular death and incident cardiac failure, is the most appropriate choice.

A Insulin

Insulin has no effect in reducing cardiovascular risk, and indeed may increase the risk of heart failure in patients with type 2 diabetes. As such, it is best avoided here.

C Lixisenatid

Although liraglutide has shown a positive effect on MACE, lixisenatide has not shown an impact on MACE events in a secondary prevention type 2 diabetes population.

D Saxagliptin

Saxagliptin showed no positive impact on MACE events, although its use was associated with a small increase in cardiac failure episodes during the course of a cardiovascular outcome trial.

E Sitagliptin

Sitagliptin shows no positive impact on MACE events, although unlike saxagliptin the use of sitagliptin did not increase the risk of cardiac failure in the context of its cardiovascular outcome trial.

A 37-year-old man with a 30-year history of type 1 diabetes comes to the clinic for review. He takes a basal bolus insulin regime of 22 units of long-acting insulin (Insulotard®) per day and 6 units of short-acting insulin (Actrapid®) with each meal.

His main problem is unpredictable hypoglycaemic episodes, which occur during the day, normally a few hours after each meal. He has peripheral neuropathy affecting the soles of both feet, but is otherwise well.

Examination reveals a BP of 105/80 mmHg, with pulse 70/min and regular. His BMI is 21.

Investigations:

Hb	13.2 g/dl
WCC	7.1 × 10^9/l
PLT	199 × 10^9/l
Na^+	137 mmol/l
K^+	4.4 mmol/l
Creatinine	102 µmol/l
Glucose	6.1 mmol/l
HbA1c	53 mmol/mol (7.0%)

Which of the following is the most appropriate next step?

A Arrange a 72 continuous glucose monitor recording

B Change the Insulotard® to insulin glargine

C Reduce the dose of the Actrapid®

D Reduce the dose of Insulotard®

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Which of the following is the most appropriate next step?

A	Arrange a 72 continuous glucose monitor recording
B	Change the Insulotard® to insulin glargine
C	Reduce the dose of the Actrapid®
D	Reduce the dose of Insulotard®
E	Refer for Dose Adjustment for Normal Eating (DAFNE) education.

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E Refer for Dose Adjustment for Normal Eating (DAFNE) education.

In this situation it is possible that the patient has never been educated about matching short-acting insulin to the carbohydrates consumed with the meal. In the first instance he is likely to benefit from DAFNE education, teaching him to take appropriate short-acting insulin for the meal he has eaten. Reducing the dose of his insulin is likely to lead to deterioration in his glycaemic control.

B Change the Insulotard® to insulin glargine

This is more likely to impact on fasting hypoglycaemia during the overnight period, rather than daytime hypo episodes.

A Arrange a 72 continuous glucose monitor recording

Although continuous glucose monitoring may elucidate the daytime hypoglycaemia episodes, it won't initiate the change in behaviour which is driven by DAFNE education.

C Reduce the dose of the Actrapid®

A blanket reduction in the dose of Actrapid® is likely to drive hyperglycaemia; as such, it should be avoided here if possible.

D Reduce the dose of Insulotard®

This would have most impact on nocturnal rather than daytime hypoglycaemia.

40345

Rate this question:

A 54-year-old woman presents to her general practitioner (GP) complaining of thirst and lethargy. She has been feeling unwell for some time, and is now suffering from an erythematous rash that began on her groin but has now spread to involve the buttocks, lower limbs and perineum. Her GP read in a dermatology text that the rash may be necrolytic migratory erythema (NME). There is associated glossitis and vaginitis. Fasting blood glucose is raised, at 8.1 mmol/l. On further questioning she admits to weight loss of a few kilograms over the past few months.

What would be the most useful investigation in this patient?

A Insulin level

B Glucagon level

C Somatostatin level

D Oral glucose tolerance test

E Insulin tolerance test

Explanation

B Glucagon level

This lady has diabetes mellitus, with the characteristic rash of necrolytic migratory erythema. Therefore, her diabetes may be secondary to a glucagonoma. Glucagonomas are extremely rare, with an annual incidence estimated at 1/20 million. Diagnosis is confirmed on finding raised plasma glucagon levels. Most primary tumours are >3 cm in diameter, 70% are malignant in nature and more than 50% have metastasised at the time of diagnosis. Tumour localisation is usually possible with abdominal ultrasound and/or computerised tomography (CT); where tumours are small, or metastatic spread is being assessed, octreotide scanning may be utilised. The potential for surgical cure is only 5%; octreotide is useful for controlling the rash, although its effects on associated diabetes and weight loss are more variable. Palliative chemotherapy using streptozocin and fluorouracil does produce acceptable reductions of glucagon over a 1-year period. Selective tumour embolisation via the hepatic artery may be of additional value.

A Insulin level

Insulin levels are most useful in assessment of hypoglycaemia, checked in conjunction with a c-peptide and glucose at the time of an episode. In insulinoma elevated insulin and c-peptide are seen with a low blood glucose.

C Somatostatin level

Although a somatostatinoma may be associated with the development of impaired glucose tolerance, it is not associated with the characteristic skin rash of glucagonoma seen here.

insulin levels are most useful in assessment of hypoglycaemia, checked in conjunction with a c-peptide and glucose at the time of an episode. In insulinoma elevated insulin and c-peptide are seen with a low blood glucose.

C	Somatostatin level

Although a somatostatinoma may be associated with the development of impaired glucose tolerance, it is not associated with the characteristic skin rash of glucagonoma seen here.

D	Oral glucose tolerance test

This will merely confirm the diagnosis of diabetes mellitus without elucidating the underlying cause.

E	Insulin tolerance test

Insulin tolerance testing is used in the evaluation of patients with growth hormone deficiency.

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necrolytic migratory erythema

Necrolytic Migratory Erythema | NEJM
nejm.org

Necrolytic migratory erythema | Primary ...
pcds.org.uk

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Download. Figure: 1. Necrolytic migratory erythema

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You are in a Medical Outpatients Clinic seeing a 53-year-old woman. She is hypertensive and has been treated with atenolol for the last 2 years.

While in the clinic, she asks your advice regarding the use of hormone replacement therapy (HRT). She suspects that she is menopausal due to hot flushes, mood swings and lack of periods for the last 5 months.

She has no past medical history of thromboembolism, stroke or breast cancer. However, having read conflicting results about HRT in the press, she is concerned about the risk of deep venous thrombosis (DVT) and heart disease.

Which of the following statements is correct with respect to HRT (combined oestrogen-progestin therapy)?

A	HRT reduces the risk of coronary artery disease
B	HRT has a protective effect on the risk of DVT
C	Risk of strokes is reduced by HRT
D	Risk of DVT is 2-4 times higher in women on HRT
E	HRT has no effect on the risk of DVT

D	Risk of DVT is 2-4 times higher in women on HRT

The WHI is the largest available clinical trial on HRT. It was stopped after 5 years - 3 years early - because it revealed increased dangers. Older age and obesity added to the risk associated with a regimen of oestrogen plus progestin. Thinner and younger women were at a low absolute risk of DVT, although their risk was still twofold higher among women taking oestrogen plus progestin, compared with women taking placebo.

A	HRT reduces the risk of coronary artery disease

Clinical trial evidence from the Heart and Oestrogen/Progestin Replacement Study (HERS) and the Women's Health Initiative (WHI) have shown that oestrogen therapy, with or without progestin, is associated with an increased risk of DVT.

B	HRT has a protective effect on the risk of DVT

HERS has shown no reduced risk of coronary artery disease in women taking HRT.

C	Risk of strokes is reduced by HRT

The WHI has shown that the risk of having an ischaemic stroke is increased in those taking HRT due to an increased risk of blood clotting.

E	HRT has no effect on the risk of DVT

4 times in those taking HRT.

A 32-year-old man presents for review. He has told his general practitioner (GP) that he consumes up to 8 or 9 l of drinks per day and is constantly up during the night and day to pass urine. The GP has checked some routine bloods; a fasting blood sugar is 3.4 mmol/l. You arrange a water deprivation test:

Maximal serum osmolality after fluid deprivation	290 mOsmol/kg (278–300)
Urine osmolality after fluid deprivation	830 mOsmol/kg (>750)
Urine osmolality after desmopressin	841 mOsmol/kg (>750)

What diagnosis fits best with this clinical picture?

A	Cranial diabetes insipidus (DI)
B	Primary polydipsia
C	Nephrogenic DI
D	Partial nephrogenic DI
E	Hyporeninaemic hyperaldosteronism

B Primary polydipsia

Results of the fluid deprivation test are crucial in determining the correct diagnosis here. In this test, patients are deprived of fluids for a period of 8 h or until 5% of body weight is lost. Patients should be weighed hourly. Plasma osmolality is measured 4-hourly, with urine volume and osmolality measurements occurring every 2 h. The patient is then given 2 µg intramuscular (i/m) desmopressin, with urine volume and urine and serum osmolality measured over the next 4 h. Where urine osmolality reaches levels >800 mOsmol/kg without desmopressin, then the diagnosis is primary polydipsia. This patient should be offered behavioural advice about slowly reducing his fluid intake.

A Cranial diabetes insipidus (DI)

If serum osmolality rises above 305 mOsmol/kg in the water deprivation test, then the patient is said to have DI and the test is stopped. Urine osmolality <300 mOsmol/kg after fluid deprivation, rising to >800 mOsmol/kg after desmopressin, indicates cranial DI.

C Nephrogenic DI

Urine osmolality <300 mOsmol/kg in the water deprivation test, remaining at <300 mOsmol/kg after desmopressin, indicates nephrogenic DI.

D Partial nephrogenic DI

Where urine osmolality at the end of the water deprivation test is intermediate (300–800 mOsmol/kg), and fails to rise above 800 mOsmol/kg after desmopressin, the diagnosis may be partial DI or polydipsia.

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A 49-year-old man with a history of diabetes mellitus and hypertension is referred to the Endocrine Clinic. Most recently, he has noticed swelling of his hands and is unable to keep his wedding ring on. His brother also visited from Australia, and thought that his appearance had changed a little.

Medication includes ramipril 10 mg daily, amlodipine 10 mg daily, metformin 1 g BD and gliclazide 160 mg BD. On examination he has soft tissue swelling of his hands and a prominent lower jaw. He is hypertensive, with a BP of 162/90 mmHg.

Investigations:

Hb	13.9 g/dl
WCC	4.6×10^9/l
PLT	200×10^9/l
Na^+	140 mmo/l
K^+	4.8 mmol/l
Creatinine	155 μmol/l
HbA1c	68.31 mmol/mol (8.4%)

You arrange for him to undergo a 75 g oral glucose tolerance test. You look at the low point reached in terms of growth hormone level during the test.

Immunoradioassay reveals a growth hormone level of 1.6 mcg/l and you diagnose a growth hormone-producing adenoma. He progresses to surgery, but he then presents 1 year later with a raised IGF-1 level. His diabetes control has worsened a little and again his blood pressure is proving difficult to control.

Which of the following would be the most appropriate option for first-line medical therapy for him?

Hb	13.9 g/dl
WCC	4.6 × 10⁹/l
PLT	200 × 10⁹/l
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Which of the following would be the most appropriate option for first-line medical therapy for him?

A	Selegeline
B	Bromocriptine
C	Somatostatin analogue
D	Pegvisomant
E	Pergolide

E Pergolide

Explanation

C Somatostatin analogue

Dopamine agonists are somewhat less effective in the treatment of acromegaly than they are in the treatment of hyperprolactinaemia. For this reason, somatostatin analogues are considered first-line medical therapy. Treatment failures may be considered for pegvisomant, a growth hormone antagonist. Indeed, pegvisomant may be more suitable for patients with particularly marked features of hyperinsulinaemia, as in this gentleman, but currently it is considered a choice only for those who have failed therapy with a somatostatin analogue.

A Selegeline

Selegiline, at normal clinical doses, is a selective irreversible MAO-B inhibitor. In larger doses, it loses its specificity and also inhibits MAO-A. It is available in tablet form and is used to reduce symptoms in early-stage Parkinson's disease. A transdermal patch is used to treat depression.

B Bromocriptine

It is a dopamine agonist and the alternative to cabergoline as first-line treatment for prolactin-secreting pituitary adenomas.

D Pegvisomant

Pegvisomant is a growth hormone receptor antagonist used in the treatment of acromegaly. It is primarily used if the pituitary gland tumour causing the acromegaly cannot

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D	Pegvisomant

Pegvisomant is a growth hormone receptor antagonist used in the treatment of acromegaly. It is primarily used if the pituitary gland tumour causing the acromegaly cannot be controlled with surgery or radiation, and the use of somatostatin analogues is unsuccessful, but is also effective as a monotherapy.

E	Pergolide

Pergolide is an ergoline-based dopamine receptor agonist used in some countries for the treatment of Parkinson's disease (PD). PD is associated with reduced dopamine activity in the substantia nigra of the brain. Pergolide acts on many of the same receptors as dopamine to increase receptor activity.

Rate this question:

A 50-year-old gentleman with a past history of atrial fibrillation and periods of paroxysmal ventricular tachycardia on 24hr tape,is referred to the outpatient clinic with weight loss and tremor. He is clinically hyperthyroid. He takes warfarin and amiodarone.

Blood results are as follows:

Thyroxine (T_4)	100 nmol/l
Thyroid-stimulating hormone (TSH)	<0.01 mu/l

A colour flow Doppler ultrasound of his thyroid shows increased blood flow.

What would be the preferred next management step?

A Stop amiodarone

B Start prednisolone 30 mg OD and carbimazole 40 mg OD

C Start carbimazole 40 mg OD

D Arrange a thyroidectomy

E Arrange radioiodine therapy

9393

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What would be the preferred next management step?

Your answer was incorrect

- A Stop amiodarone
- B Start prednisolone 30 mg OD and carbimazole 40 mg OD
- C Start carbimazole 40 mg OD
- D Arrange a thyroidectomy
- E Arrange radioiodine therapy

Explanation

C Start carbimazole 40 mg OD

This is an example of type 1 amiodarone-induced hyperthyroidism (AIT). The high iodine content of the

C Start carbimazole 40 mg OD

This is an example of type 1 amiodarone-induced hyperthyroidism (AIT). The high iodine content of the amiodarone induces release of thyroid hormone (Jod-Basedow effect) and causes hyperthyroidism. In type 2 AIT the amiodarone causes a destructive thyroiditis. Colour flow Doppler ultrasound can be used to differentiate the two: blood flow is increased in type 1 and decreased in type 2. High-dose anti-thyroid drugs are needed to treat type 1 AIT as they have less effect due to the high iodine load.

B Start prednisolone 30 mg OD and carbimazole 40 mg OD

Steroids in combination with anti-thyroid drugs help to treat type 2 AIT. However, these have no role in type 1 AIT.

A Stop amiodarone

Amiodarone should be discontinued if possible, but in this case, given the VT, this decision should be considered carefully in conjunction with a cardiologist. Withdrawal of amiodarone alone will have no immediate effect due to the long half-life of amiodarone.

D Arrange a thyroidectomy

Thyroidectomy is rarely recommended as first-line treatment for thyrotoxicosis. Thyroidectomy in a thyrotoxic patient may precipitate thyroid storm.

E Arrange radioiodine therapy

Radioiodine is not usually effective because of reduced uptake by the thyroid due to high iodine levels.

A 60-year-old woman has been referred to the Endocrine Clinic with a history of increasing shoe size and problems with her dentures fitting. She also complains of flushing and sweating.

Routine blood testing at the initial clinic appointment confirms an elevated random blood glucose and an elevated IGF-1. Because of a suspected diagnosis of acromegaly, an oral glucose tolerance test with growth hormone is performed as well as a gadolinium-enhanced magnetic resonance image (MRI) of the pituitary. She attends for review after the tests have been performed.

The results of the oral glucose tolerance test are as follows:

Time (min)	Growth hormone (GH) (mU)
0	8
30	8 (elevated)
60	7
90	8
120	9
180	9

The gadolinium-enhanced MRI of the pituitary is reported as not showing an adenoma, although the pituitary appears slightly enlarged overall.

Which step would you take next to best manage her case?

A	Arginine test
B	CT of the chest and abdomen
C	Refer for transphenoidal hypophysectomy

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D	Insulin tolerance test
E	Inferior petrosal vein sampling

32891

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The gadolinium-enhanced MRI of the pituitary is reported as not showing an adenoma, although the pituitary appears slightly enlarged overall.

Which step would you take next to best manage her case?

Your answer was incorrect

A Arginine test

B CT of the chest and abdomen

Explanation

B | **CT of the chest and abdomen**

The oral glucose tolerance test shows non-suppression of GH secretion, with the 75 g glucose load indicating the diagnosis of acromegaly. However, the magnetic resonance image (MRI) of the pituitary shows no adenoma, which is unusual. This raises the possibility of other causes of acromegaly. The patient complains of flushing, which is a symptom of carcinoid syndrome. Carcinoid tumours can rarely produce GH-releasing hormone (GhRH), causing pituitary hyperplasia and acromegaly. CT of the chest and abdomen would be used to look for a carcinoid tumour, and chromogranin A, also known as parathyroid secretory hormone 1, is a serum marker for carcinoid tissue.

E | **Inferior petrosal vein sampling**

Inferior petrosal vein sampling is useful to localise a source of elevated ACTH. Given the MRI shows no adenoma, this is unlikely to be a useful step.

A | Arginine test

Administration of arginine promotes GH release and is therefore used in the evaluation of GH deficiency.

C | Refer for transphenoidal hypophysectomy

Without a discrete adenoma, pituitary surgery is not indicated here.

D | Insulin tolerance test

Like the arginine test, the insulin tolerance test is used in evaluation of growth hormone deficiency, and therefore has no role here, its use has also fallen off in recent years

E	Inferior petrosal vein sampling

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C	Refer for transphenoidal hypophysectomy

Without a discrete adenoma, pituitary surgery is not indicated here.

D	Insulin tolerance test

Like the arginine test, the insulin tolerance test is used in evaluation of growth hormone deficiency, and therefore has no role here. Its use has also fallen off in recent years due to significant risk of serious hypoglycaemia.

A 23-year-old woman is referred to the clinic by the Emergency department, having been admitted after fainting in the local supermarket. On further questioning it transpires that she has been feeling weak and washed out for quite some time. On examination, her BP is 105/60 mmHg, pulse is 75/min. Her BMI is 18. She has calluses on her knuckles, but tells you these are due to her job as a landscape gardener.

Investigations:

Hb	10.9 g/dl
WCC	5.0 × 10^9/l
PLT	194 × 10^9/l
Na^+	140 mmol/l
K^+	3.3 mmol/l
Creatinine	115 μmol/l
Urinary K^+	0.7 mmol/l (25–100/24 h)

Which of the following is the most likely diagnosis?

- A Bartter syndrome
- B Liddle syndrome
- C Diuretic abuse
- D Laxative abuse
- E Conn syndrome

mmHg, pulse is 75/min. Her BMI is 18. She has calluses on her knuckles, but tells you these are due to her job as a landscape gardener.

Investigations:

Hb	10.9 g/dl
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Na^+	140 mmol/l
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Creatinine	115 µmol/l
Urinary K^+	0.7 mmol/l (25–100/24 h)

Which of the following is the most likely diagnosis?

Your answer was correct

A	Bartter syndrome
B	Liddle syndrome
C	Diuretic abuse
D	Laxative abuse
E	Conn syndrome

Explanation

D Laxative abuse

This woman is underweight and has symptoms of fatigue

D Laxative abuse

This woman is underweight and has symptoms of fatigue which are consistent with hypokalaemia. The fact that she is underweight with a BMI of 18, and has calluses on her knuckles, may point towards induced vomiting and a diagnosis of bulimia, which would fit with possible laxative abuse. Laxative abuse leads to increased GI potassium loss and renal conservation of potassium, a urinary concentration of potassium of <1 mmol/l being highly suggestive of laxative abuse. Urine screening exists for a range of possible laxatives, and the patient should be consented for a urinary laxative screen with appropriate counselling.

A Bartter syndrome

This is an autosomal recessive renal tubular disorder characterised by hypokalaemia, hypochloraemia, metabolic alkalosis and hyper-reninaemia with normal blood pressure. Urinary potassium excretion is high due to the inability of the kidneys to retain potassium.

B Liddle syndrome

This is a rare hereditary disorder involving increased activity of the epithelial sodium channel (ENaC) which causes the kidneys to excrete potassium but retain too much sodium and water, leading to hypertension. Symptoms are of hypertension, fluid retention hypokalaemia and metabolic alkalosis. The urinary potassium excretion is high.

C Diuretic abuse

The use of thiazide diuretics leads to hypokalaemia through increased potassium excretion in the urine.

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C Diuretic abuse

The use of thiazide diuretics leads to hypokalaemia through increased potassium excretion in the urine.

E Conn syndrome

Conn syndrome, or primary hyperaldosteronism, occurs due to excess production of the hormone aldosterone by the adrenal glands, resulting in low renin levels. Around 66% of cases are due to enlargement of both adrenal glands and 33% are due to an adrenal adenoma that produces aldosterone. Most people have hypertension requiring treatment with more than three agents. Primary hyperaldosteronism causes hypernatraemic, hypokalaemic, metabolic alkalosis. The urinary excretion of potassium is high.

A 50-year-old woman with Graves' disease attends clinic for follow-up of her thyroid status. She is currently taking propranolol and carbimazole. In the clinic she complains of sore eyes and double vision, particularly at extremes of gaze. Examination reveals marked proptosis. Her blood pressure is normal at 122/82, pulse is 60 and regular. She has tried artificial tears and eye patches with no relief.

Which of the following would be the initial treatment of choice to improve the ophthalmopathy?

A Radioiodine

B Ibuprofen

C IV glucocorticoids

D Surgical decompression

E Orbital radiotherapy

C IV glucocorticoids

Graves' disease causes ophthalmopathy with signs of lid lag, lid retraction (related to thyrotoxicosis), proptosis and diplopia (related to Graves' itself). There are usually two phases: an initial inflammatory phase followed by a fibrotic stage. If the symptoms are mild, patients can be managed with lubricants, eye patches and smoking cessation. This lady has active disease (pain, eyelid redness and swelling), which is sight-threatening (exophthalmos, diplopia and loss of colour vision). For sight-threatening dysthyroid optic neuropathy, the initial treatment option is IV glucocorticoids (methylprednisolone 500 mg once weekly and subsequently tapering down).

E Orbital radiotherapy

This is an alternative option to reduce acute orbital inflammation, but it is not recommended for dysthyroid optic

A Radioiodine

Radioiodine is a definitive treatment option for relapsed Graves' thyrotoxicosis. There is concern that radioiodine could exacerbate Graves' ophthalmopathy. Patients with active Graves' ophthalmopathy receiving radioiodine treatment should be offered steroid cover. Radioiodine treatment can safely be given to patients with inactive Graves' ophthalmopathy provided hypothyroidism is avoided.

B Ibuprofen

This is used as first-line treatment for symptom control in cases of subacute thyroiditis.

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B Ibuprofen

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D Surgical decompression

This may be done to decompress the orbit, improve proptosis and address strabismus, but is performed 1-2 weeks after IV glucocorticoids if the response is poor.

An 18-year-old man presents to his general practitioner (GP) with recurrent episodes of penile thrush. He has no other significant symptoms indicating hyperglycaemia. A strong family history of type 2 diabetes is noted and the GP arranges to check fasting plasma glucose. Two samples are checked and the laboratory glucose results are 8.1 and 8.2 mmol/l. Urine is negative for ketones. Haemoglobin A1C, also checked by the GP, is elevated at 74 mmol.mol (8.9%). His BMI is 22 and his BP is 105/72.

Which one of the following is the most appropriate initial therapy for this patient?

A	Metformin
B	Gliclazide
C	Sitagliptin
D	Basal bolus insulin
E	Acarbose

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Your answer was correct

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Explanation

B Gliclazide

This man is most likely to have maturity onset of diabetes

B Gliclazide

This man is most likely to have maturity onset of diabetes of youth 3 (MODY3) due to HNF1-alpha mutation (hepatic nuclear factor-1). MODY3 is the cause of 1-2% of type 2 diabetes and makes up around 70% of MODY cases. It presents most commonly in early adulthood and is associated with severe hyperglycaemia in some cases and frequent microvascular complications. One-third of patients require insulin therapy and around one-third may be controlled on oral hypoglycaemic drugs. Sulphonylureas (SUs) would be the initial drug of choice because, at least for the first few years, the capacity to secrete insulin is preserved and the use of SUs restores insulin release, avoiding the need for insulin therapy. The next commonest MODY variant is MODY 2, which results from a glucokinase mutation leading to altered glucose sensing in pancreatic beta cells. In contrast, 90% of MODY2 patients are controlled on diet therapy alone.

A Metformin

Metformin primarily reduces hepatic glucose output and has minor positive effects on weight control. As such, it is the initial therapy of choice for overweight and obese patients with type 2 diabetes.

C Sitagliptin

Sitagliptin potentiates the incretin effect by preventing the breakdown of endogenous GLP-1; it is used as adjunctive therapy in type 2 diabetes.

D Basal bolus insulin

Basal bolus insulin therapy may well not be required for the majority of patients with MODY for a considerable period

You review a 42-year-old man who is referred to your private clinic after a general practitioner (GP) medical. He has a family history of premature cardiovascular disease. A trial of statin therapy was abandoned due to muscle pains at the lowest dose. Cholesterol testing reveals triglyceride levels of 4.2 mmol/l and a high-density lipoprotein (HDL) level of 0.8 mmol/l. You elect to commence him on fibrate therapy.

Which of the following options best describes the mode of action for fibrates?

A	Inhibition of hydroxymethylglutaryl-CoA (HMG-CoA) reductase activity
B	Inhibition of cholesterol ester transferase protein (CETP) activity
C	Inhibition of adipocyte lipolysis
D	Bile acid sequestration
E	Activation of lipoprotein lipase

E Activation of lipoprotein lipase

The mode of action of fibrates is by enhancing lipoprotein lipase activity, increasing low-density lipoprotein (LDL) receptor-mediated clearance of LDL and increasing high-density lipoprotein (HDL) synthesis. This leads to a corresponding lowering of triglycerides, due to a fall in very low-density lipoprotein (VLDL) and a rise in HDL. In total, these reduce triglyceride levels by 20–60%, LDL by 5–25% and increase HDL by 15–30%.

B Inhibition of cholesterol ester transferase protein (CETP) activity

CETP inhibitors elevate HDL cholesterol and are thought to drive reverse cholesterol transport.

A Inhibition of hydroxymethylglutaryl-CoA (HMG-CoA) reductase activity

This is the rate-limiting step in cholesterol synthesis and is the mode of action of statins.

C Inhibition of adipocyte lipolysis

Niacin inhibits adipocyte lipolysis, but many patients don't like using niacin because of side effects, including itching.

D Bile acid sequestration

Resins, such as cholestyramine, sequester bile acids thereby leading to a reduction in LDL cholesterol.

A 28-year-old woman with chronic kidney disease as a result of long-standing reflux nephropathy goes to her GP complaining of tiredness. She currently takes ramipril and indapamide for hypertension.

On examination, her BP is 142/88 mmHg and she looks pale and washed-out. Her pulse is 72 bpm and regular.

Investigations:

Hb	10.4 g/dl
WCC	5.6 × 10^9/l
PLT	198 × 10^9/l
Na^+	139 mmol/l
K^+	5.2 mmol/l
Creatinine	232 μmol/l
TSH	1.5 U/l (< 0.5-4.5)
Total T4	45 nmol/l (58-161)
Total T3	0.8 nmol/l (0.9-2.8)

Which of the following is the most likely diagnosis?

A Hashimotos's thyroiditis

B Pituitary failure

C Sick euthyroid syndrome

D Iodine deficiency

E Thyroxine-binding globulin deficiency

Question 16 of 91

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Explanation

E Thyroxine-binding globulin deficiency

Thyroxine-binding globulin (TBG) deficiency is a non-harmful condition that is either acquired or inherited. The thyroid hormones - thyroxine (T4) and 3,5,3′-triiodothyronine (T3) - circulate in the blood by reversibly binding to carrier proteins. Although only 0.3% or less of T3 and T4 circulates unbound, it is this free hormone fraction that is metabolically active at the tissue and cellular level. The three main proteins that carry the majority (>95%) of thyroid hormones are TBG), transthyretin (TTR, or prealbumin) and albumin.

Thyroid hormone binding to TBG is characterised by low

E Thyroxine-binding globulin deficiency

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Thyroid hormone binding to TBG is characterised by low capacity but high avidity. Inherited or acquired variations in the concentration and/or affinity of these proteins may produce substantial changes in serum total thyroid hormone levels as measured by commercially available assays. Notably, these changes do not result in illness (i.e. hypothyroidism or hyperthyroidism), because the concentration of free thyroid hormones does not change.

A deficiency in thyroid hormone-binding proteins is suspected when abnormally low serum total thyroid hormone concentrations are encountered in clinically euthyroid subjects in the presence of normal serum thyroid-stimulating hormone (TSH). More specifically, low TBG is suggested because this protein carries the majority of the serum thyroid hormones.

Thyroid function tests (TFTs) in patients with TBG deficiency show normal TSH and free T4, but low total T4 and, occasionally, low total T3 serum concentrations. The most important clinical aspect of TBG deficiency states is recognition of these disorders and avoidance of unnecessary and potentially harmful thyroid hormone replacement therapy.

A Hashimotos's thyroiditis

Hashimoto's thyroiditis is an autoimmune condition causing

A 28-year-old woman attends the endocrine clinic because of inability to achieve a pregnancy. She and her husband have been trying for some 3 years for a child without success. Her general practitioner (GP) has measured a prolactin level of 2600 mU/l (normal <360). You arrange pituitary magnetic resonance imaging (MRI) that demonstrates a microprolactinoma. She elects for pharmacotherapy.

Which one of the following agents is the most appropriate treatment choice?

A	Bromocriptine
B	Fluphenazine
C	Domperidone
D	Haloperidol
E	Chlorpheniramine

Explanation

A **Bromocriptine**

Bromocriptine is a dopamine agonist that leads to activation of D2 receptors. Side effects may include nausea and postural hypotension. Rarely, patients have been known to develop hallucinations and psychosis with therapy, but this is only at very high drug doses. It is important to warn female patients that, within a few months, menstrual cycles are likely to return and that pregnancy has a much higher probability of occurring. When patients become pregnant, they should cease dopamine agonist therapy as soon as they have a positive pregnancy test. More modern dopamine agonists such as ropinirole are also used in the management of prolactinomas, although there is less longitudinal evidence to support their safety in early pregnancy.

B Fluphenazine

This is a phenothiazine dopamine antagonist that actually increases dopamine levels. It is used as a treatment for chronic schizophrenia.

C Domperidone

Domperidone is a dopamine antagonist prokinetic anti-emetic which doesn't have a role in the treatment of prolactinoma.

D Haloperidol

Haloperidol is recommended in **NICE guidelines** for the treatment of agitation related to delirium in the elderly, where other interventions such as 1:1 nursing have failed to

and postural hypotension. Rarely, patients have been known to develop hallucinations and psychosis with therapy, but this is only at very high drug doses. It is important to warn female patients that, within a few months, menstrual cycles are likely to return and that pregnancy has a much higher probability of occurring. When patients become pregnant, they should cease dopamine agonist therapy as soon as they have a positive pregnancy test. More modern dopamine agonists such as ropinirole are also used in the management of prolactinomas, although there is less longitudinal evidence to support their safety in early pregnancy.

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Haloperidol is recommended in **NICE guidelines** for the treatment of agitation related to delirium in the elderly, where other interventions such as 1:1 nursing have failed to control the situation. It is a dopamine antagonist.

E Chlorpheniramine

Chlorpheniramine is a sedative antihistamine used in the treatment of allergic reactions, including hay fever and urticaria.

A 42-year-old woman attends her GP appointment complaining of a 3-week history of a sore throat associated with lethargy, a reduced appetite and general viral symptoms. She has also felt frequent palpitations recently and increased sweating but these appear to be settling, with the patient now complaining of occasional palpitations. Other symptoms include pain in the lower part of her neck made worse with swallowing and an occasional hoarseness of her voice. She is otherwise fit and well, is not on any medications and is a non-smoker. There is no significant family history. The only positive findings on examination were residual tenderness over her lower anterior neck to palpation and mild tachycardia associated with warm skin to touch. No lymphadenopathy was palpable.

The GP arranged for some thyroid function tests, which showed a T_4 level slightly above normal and a TSH level of <0.1 mU/l. Her GP diagnosed a viral illness and then commenced carbimazole 20 mg bd on the basis of her TFT results. Two months later, the patient again attended her GP but this time complaining of increased lethargy, weight gain and a minor discomfort in the lower part of her neck.

What would be the next most appropriate management step?

A Adjust the dose of carbimazole to control the patient's symptoms

B Stop carbimazole and consider replacement thyroid hormone therapy if symptoms don't recover

C Refer the patient for an ultrasound scan of the thyroid gland

D Refer patient for a fine needle aspiration biopsy of

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C	Refer the patient for an ultrasound scan of the thyroid gland
D	Refer patient for a fine needle aspiration biopsy of the thyroid gland
E	Change carbimazole to proplythiouracil

7633

B Stop carbimazole and consider replacement thyroid hormone therapy if symptoms don't recover

De Quervain thyroiditis is the most common cause of a painful thyroid gland and causes hyperthyroidism initially, sometimes followed by transient hypothyroidism. The underlying cause is felt to be either a viral infection or the post-viral inflammatory response. The condition is more common in females. The typical course of the disease consists of an acute phase, in which the main complaint is pain, although signs of hyperthyroidism may also be present. This is followed by a transient asymptomatic and euthyroid phase, which evolves into the hypothyroid phase. The hypothyroid state may become permanent in 5-10% of patients, but the vast majority go on to the recovery phase, characterised by normalisation of thyroid structure and function. The treatment is consequently directed towards the control of pain and thyroid symptoms. Initial symptomatic hyperthyroidism can be treated with beta-blockade. Beta-adrenergic blockers are usually the sole form of treatment indicated/required in cases of thyroiditis, although severe, persistent symptoms/signs in may require additional therapy with salicylates and/or glucocorticoids. If hypothyroidism occurs in the late stages, replacement therapy is required and is guided by the TSH levels.

A Adjust the dose of carbimazole to control the patient's symptoms

The patient's symptoms are caused by the hypothyroid phase of De Quervain's thyroiditis, rather than the carbimazole.

C Refer the patient for an ultrasound scan of the thyroid gland

carbimazole.

C	Refer the patient for an ultrasound scan of the thyroid gland

Ultrasound scanning should be performed in patients presenting with a single palpable nodule.

D	Refer patient for a fine needle aspiration biopsy of the thyroid gland

Fine needle aspiration should always be performed on solitary nodules >10 mm, those <10 mm with suspicious imaging characteristics or on dominant nodules.

E	Change carbimazole to proplythiouracil

The patient's symptoms are not due to carbimazole. Propylthiouracil and carbimazole are both associated with agranulocytosis and must be stopped if this complication is suspected, and only restarted if a blood count has confirmed that the white cell count is in fact normal.

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A 28-year-old single man with type 1 diabetes presents for review. His HbA1c is 50.82 mmol/mol (6.8%) yet he is concerned that morning sugars are occasionally as high as 24 mmol/l. He is also suffering from frequent nightmares.

He is currently managed on a basal bolus insulin regime. His blood pressure is 112/82, with pulse 67 and regular. Creatinine is normal and he has 1+ of protein on urine testing.

Which of the following is most appropriate for his further management?

A Increase his nocturnal dose of long-acting insulin

B Switch his nocturnal long-acting insulin to morning dosing

C Divide his nocturnal long-acting insulin into morning and evening doses

D Add in an extra dose of short-acting insulin with a snack at 10 pm

E Arrange for continuous glucose monitoring

32906

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Your answer was incorrect

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Explanation

E Arrange for continuous glucose monitoring

His long-term blood glucose control is excellent, and his occasional high morning sugars are suggestive of the

E Arrange for continuous glucose monitoring

His long-term blood glucose control is excellent, and his occasional high morning sugars are suggestive of the Somogyi effect, related to nocturnal hypoglycaemia, reactive release of counter-regulatory hormones such as adrenaline and rebound hyperglycaemia. Continuous glucose monitoring would be useful in producing a 72 h profile of glucose excursions to rule out nocturnal hypoglycaemia. In the event that a significant problem with morning dipping in glucose is revealed, then his long-acting insulin dose will require a reduction, as may his short-acting evening insulin dose.

See also *The Lancet* 1980, Gale *et al.*, 316(8189):279-282.

C Divide his nocturnal long-acting insulin into morning and evening doses

Steady state dosing and long-half-life insulin mean that there is only a minor impact on blood glucose levels from splitting the dose.

A Increase his nocturnal dose of long-acting insulin

Until nocturnal hypoglycaemia is excluded, increasing his nocturnal dose of long-acting insulin risks life-threatening hypoglycaemia.

B Switch his nocturnal long-acting insulin to morning dosing

Modern long-acting insulin analogues should not have a significant variance in their effect if they are dosed in the morning or the evening, because of their long half-life and ability to reach steady state. As such, there is no value in switching the timing of the dose.

You review a 62-year-old type 2 diabetic who is taking metformin 2 g per day and gliclazide 160 mg per day and ramipril for renoprotection. Recent HbA1c was 68.31 mmol/mol (8.4%) and his blood pressure was 140/75 mmHg. You review his eye photograph that reveals dot-and-blot haemorrhages, cotton wool spots and micro-aneurysms. None are within close proximity to the macula.

Which of the following treatments represents the best option for reducing the probability of further deterioration of his diabetic retinopathy over the long term?

A	Gradual transition to insulin therapy
B	Addition of valsartan to his blood pressure regime
C	Addition of amlodipine to his blood pressure regime
D	Laser therapy
E	Increasing gliclazide to 320 mg/day

32911

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Explanation

A Gradual transition to insulin therapy

This patient's blood pressure is relatively well controlled, yet there is room for significant improvement in his blood glucose. Achievement of the target HbA1c of 47.54 mmol/mol (7.0%) would be associated with significantly

A	Gradual transition to insulin therapy

This patient's blood pressure is relatively well controlled, yet there is room for significant improvement in his blood glucose. Achievement of the target HbA1c of 47.54 mmol/mol (7.0%) would be associated with significantly reduced progression of retinopathy.

B	Addition of valsartan to his blood pressure regime

Addition of ARB to an ACE inhibitor brings little added impact on blood pressure control, with significantly increased risk of hyperkalaemia. As such, it should be avoided.

C	Addition of amlodipine to his blood pressure regime

The next step in further intensification of blood pressure control is addition of a calcium antagonist such as amlodipine, although amongst the calcium antagonist class, only diltiazem has been shown to impact significantly on proteinuria.

D	Laser therapy

Although laser therapy reduces progression of retinopathy, there are no high-risk features currently identified on retinal photography.

E	Increasing gliclazide to 320 mg/day

The dose-response curve for gliclazide above 160 mg is fairly flat, and hence there is little value in a further increase in sulphonylurea dose.

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A 52-year-old man comes to an annual check-up clinic for type 2 diabetes mellitus which is controlled by metformin. He was diagnosed with diabetes 11 years ago after an inferior myocardial infarction. In the clinic today his blood pressure (BP) is 160/95 mmHg and his body mass index (BMI) is 26. He has normal fundi and examination of his feet shows normal sensation and peripheral pulses. As well as his metformin he takes amlodipine 5 mg OD and simvastatin 40 mg ON.

Investigations:

Cholesterol	4.6 mmol/l
Urea	7.4 mmol/l
Creatinine	109 µmol/l
HbA1c	57.38 mmol/mol (7.4%)
Albumin : creatinine ratio	3.8 mg/mmol (<3.5 males/<3.5 females)

Which of the following is likely to have the greatest impact on his future risk of complications?

A	Start a sulphonylurea
B	Start insulin
C	Add an angiotensin-converting enzyme (ACE) inhibitor to his calcium channel antagonist
D	Add a thiazide diuretic to his calcium channel antagonist
E	Add a fibrate to his statin therapy

C Add an angiotensin-converting enzyme (ACE) inhibitor to his calcium channel antagonist

NICE guidelines suggest a target BP of 140/80 mmHg in type 2 diabetes. First-line antihypertensive drug treatment should be an ACE inhibitor. This patient also has microalbuminuria - a sign of diabetic nephropathy. ACE inhibitors significantly reduce the risk of all-cause mortality for patients with diabetic kidney disease.

A Start a sulphonylurea

NICE guidelines suggest a target HbA1c of <53 mmol/mol (<7%) in type 2 diabetes mellitus. Unfortunately, in late-stage patients who have a positive cardiovascular history, both the ACCORD and VADT trials showed no benefit of aiming for a HbA1c of <47.54 mmol/mol (6.5%). Recent trials have shown improved cardiac outcomes with the addition of either SGLT2 inhibitors such as empagliflozin (EMPA-REG OUTCOME) or GLP-1 agonists such as liraglutide (LEADER), with a reduction in death from cardiovascular causes and hospitalisation for heart failure.

B Start insulin

If initial drug treatment with metformin has not continued to control HbA1c to below the person's agreed threshold for intensification, consider dual therapy with metformin combined with one combining a DPP-4 inhibitor, pioglitazone or a sulfonylurea. Insulin is only normally considered if dual therapy has not achieved adequate glycaemic control.

D Add a thiazide diuretic to his calcium channel antagonist

If the person's blood pressure is not reduced to the

You review a 46-year-old man who complains of polydipsia and polyuria. He is careful with his weight and regularly visits the gym, but still feels that his health is deteriorating and he is actually finding it difficult to maintain his weight and muscle mass. He also complains of diarrhoea and a skin rash which seems to break down and bruise/bleed easily. He has no past medical history, apart from a recent fall from his bike after which he sustained a head injury.

On examination, his blood pressure is 135/85 mmHg, with pulse 68 bpm and regular. His BMI is 25 kg/m^2. On dipstick urine testing, there are 2+ of glucose.

Which of the following would best explain these findings?

A	Head Injury
B	Hypothyroidism
C	Hyperparathyroidism
D	Glucagonoma
E	Insulinoma

6535

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B	Hypothyroidism
C	Hyperparathyroidism
D	Glucagonoma
E	Insulinoma

Explanation

D Glucagonoma

Glucagonoma is vanishingly rare, with an annual incidence estimated at 1 in 20 million, but it fits the bill here as the only potential cause of secondary diabetes mellitus from the options listed. The fact his weight is normal and he has developed diabetes whilst still maintaining a healthy weight and lifestyle is suggestive of secondary diabetes.

A Head Injury

Rana Alnasser's screen

D Glucagonoma

Glucagonoma is vanishingly rare, with an annual incidence estimated at 1 in 20 million, but it fits the bill here as the only potential cause of secondary diabetes mellitus from the options listed. The fact his weight is normal and he has developed diabetes whilst still maintaining a healthy weight and lifestyle is suggestive of secondary diabetes.

A Head Injury

Head injury can be a cause of transient diabetes insipidus that usually recovers slowly over the course of a few weeks.

B Hypothyroidism

Autoimmune thyroid disease is associated with type 1 diabetes, but wouldn't account for the glycosuria seen here.

C Hyperparathyroidism

Hyperparathyroidism may be associated with diuresis related to hypercalcaemia, but we are given no evidence here of elevated serum calcium.

E Insulinoma

Insulinomas present with recurrent episodes of collapse due to hypoglycaemia, and gradual weight gain because of compensatory eating.

A 46-year-old Bangladeshi chef was admitted with a 3-month history of night sweats, weight loss and malaise. Examination in the clinic reveals a BP of 154/88 mmHg, with pulse 80/min and regular. Auscultation of the chest appears normal apart from occasional wheezes, and the abdomen is soft and non-tender. Abdominal examination is normal. He has been checking his temperature at home and produces a diary to confirm swinging fevers up to 39.0°C over the last 2 weeks.

Investigations are:

Hb	12.1 g/dl
WCC	4.3×10^9/l
PLT	205×10^9/l
Na^+	132 mmol/l
K^+	4.9 mmol/l
Creatinine	104 µmol/l
Urea	7.0 mmol/l
CRP	72 mg/l
Sputum microscopy	No evidence of AAFB
Abdominal CT scan	Bilaterally enlarged adrenal glands

His chest X-ray is shown below:

By Mikael Häggström [CC0], from Wikimedia Commons

Which of the following is the most useful next investigation?

A	Mantoux test
B	Groccott-stained adrenal biopsy
C	Bone marrow trephine
D	17-Hydroxyprogesterone
E	Low-dose dexamethasone suppression test

B	Groccott-stained adrenal biopsy

The differential diagnosis for a pyrexia of unknown origin and bilateral adrenal swelling would be lymphoma, tuberculosis or histoplasmosis. Tuberculosis is unlikely in view of the normal chest X-ray and negative sputum cultures. Lymphoma is unlikely as the white count is normal. Histoplasmosis, which is caused by *Histoplasma capsulatum*, a dimorphic soil fungus, should therefore be excluded. A slowly progressing chronic form occurs in those who are fit and immunocompetent. Those who are weak, very young, very old or immunocompromised tend to acquire a disseminated infection. Acute infection causes malaise, fevers, anorexia and headache. It can cause a TB-like illness with dyspnoea, cough and haemoptysis, or can simply cause bilateral hilar lymphadenopathy. Disseminated infection causes bilateral adrenal enlargement in 79% of cases. It can result in adrenal insufficiency. Diagnosis made by adrenal biopsy or fine needle aspirate (FNA). The Groccott stain identifies the organism. Treatment is with itraconazole.

A	Mantoux test

The Mantoux test is used as a screening test for exposure to tuberculosis, a positive test being declared according to the degree of induration identified after the skin is inoculated with tuberculin protein.

C	Bone marrow trephine

Bone marrow involvement is seen in chronic disseminated histoplasmosis, although in this case adrenal biopsy is more likely to demonstrate infection.

Question 24 of 91

A 31-year-old man with type 1 diabetes comes to the clinic for advice about his blood glucose control. He has suffered a number of significant hypoglycaemic episodes over the past 2 months, which have corresponded with a wish to increase his exercise. He is currently running 15 km per week in 5 km blocks. He takes BD mixed insulin and doesn't alter his dose on the days he exercises. On examination his BP is 125/78 mmHg and his BMI is 27. There are no signs of peripheral neuropathy.

Investigations:

Hb	13.1 g/dl
WCC	7.6 x 10^9/l
PLT	210 x 10^9/l
Na^+	138 mmol/l
K^+	4.4 mmol/l
Creatinine	90 µmol/l
HbA1c	50 mmol/ml (6.73%)

Which of the following is the most appropriate next step in his management with respect to glucose and weight management?

A	Reduce his BD mixed insulin dose on the days he exercises
B	Advise him to reduce his exercise
C	Advise him to transfer to a basal bolus regime
D	Advise him to maintain the same insulin dose and take a source of sugar with him when he runs

week in 5 km blocks. He takes BD mixed insulin and doesn't alter his dose on the days he exercises. On examination his BP is 125/78 mmHg and his BMI is 27. There are no signs of peripheral neuropathy.

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C	Advise him to transfer to a basal bolus regime
D	Advise him to maintain the same insulin dose and take a source of sugar with him when he runs
E	Reassure him that he will adjust to the lower blood sugar and his hypos will subside

Explanation

C **Advise him to transfer to a basal bolus regime**

Whilst some patients with type 1 diabetes prefer to take a BD mixed insulin regime because of convenience and number of injections, it is not responsive to changes in routine such as taking intensive aerobic exercise. As such, he should be persuaded to change to a basal bolus regime where he can alter his short-acting insulin dose just prior to when he is planning exercise.

A **Reduce his BD mixed insulin dose on the days he exercises**

Reducing his BD insulin is likely to precipitate an increase in his HbA1c because his glucose outside periods of exercise will increase significantly.

B Advise him to reduce his exercise

Exercise is important with respect to maintaining fitness and reducing cardiovascular risk in type 1 diabetes. As such, aiming to reduce his exercise is inappropriate.

D Advise him to maintain the same insulin dose and take a source of sugar with him when he runs

This will blunt some of the benefits of exercise in driving a calorie deficit.

E Reassure him that he will adjust to the lower blood sugar and his hypos will subside

This runs the risk of reducing awareness of significant hypoglycaemic episodes.

A 30-year-old man attends the endocrine clinic with gynaecomastia. He had mumps aged 8, and broke his arm aged 14. Otherwise, he has no past history of note. He is on no regular medications. On examination, he is tall, with sparse secondary sexual hair pattern. His testicular volume is less than 5 ml.

Investigations:

9 am testosterone	4 nmol/l
LH	Elevated
FSH	Elevated

What is the likely underlying diagnosis?

A Kallmann syndrome

B Mump's orchitis

C Pituitary adenoma

D Adrenal tumour

E Klinefelter syndrome

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Investigations:

9 am testosterone	4 nmol/l
LH	Elevated
FSH	Elevated

What is the likely underlying diagnosis?

Your answer was incorrect

A Kallmann syndrome

B Mump's orchitis

C Pituitary adenoma

D Adrenal tumour

E Klinefelter syndrome

Explanation

E Klinefelter syndrome

Low testosterone in the presence of raised LH and FSH suggests gonadal failure. Gynaecomastia and infertility are the two commonest presentations of Klinefelter syndrome

E Klinefelter syndrome

Low testosterone in the presence of raised LH and FSH suggests gonadal failure. Gynaecomastia and infertility are the two commonest presentations of Klinefelter syndrome (47,XXY karyotype), which is often but not inevitably associated with reduced secondary sexual characteristics.

B Mump's orchitis

Testicular failure following mumps is a rare complication and only occurs following mumps orchitis when contracted after puberty.

A Kallmann syndrome

Kallmann syndrome is typified by either anosmia or severe hyposmia. It is also associated with hypogonadotrophic hypogonadism.

C Pituitary adenoma

A pituitary adenoma will cause hypogonadotrophic hypogonadism, resulting in both the LH and FSH being reduced.

D Adrenal tumour

Oestrogen-producing adrenal tumours are rare and should not result in primary hypogonadism. Adrenocortical adenomas are associated with pituitary tumours in the context of multiple endocrine neoplasia type 1, but in this case would cause hypogonadotrophic hypogonadism.

A 61-year-old man is admitted having taken an overdose of unspecified medication. He is known to have type 2 diabetes, controlled with tablets, hypertension and a previous myocardial infarction.

His BP is 95/60 mmHg, with pulse 105/min and regular. His respiratory rate is 35/min.

Investigations:

Hb	12.9 g/dl
WCC	8.9 × 10^9/l
PLT	200 × 10^9/l
Na^+	143 mmol/l
K^+	4.5 mmol/l
Creatinine	132 µmol/l
Bicarbonate	15 mmol/l
Cl^-	105 mmol/l
Glucose	4.9 mmol/l

Which of the following is the most likely cause of his overdose?

A	Paracetamol
B	Atenolol
C	Ramipril
D	Metformin
E	Sitagliptin

This man has a raised anion gap metabolic acidosis. As such, the most likely cause of his overdose is metformin excess. Treatment is supportive, although in severe cases prolonged haemodialysis can be considered. Mortality is considerable, particularly in patients with underlying cardiovascular disease.

A Paracetamol

Metabolic acidosis in paracetamol overdose is a late presentation, associated with oliguria and acute kidney disease.

B Atenolol

Atenolol is associated with bradycardia and hypotension rather than the clinical picture seen here.

C Ramipril

Angiotensin-converting enzyme (ACE) inhibitor overdose leads to profound hypotension and acute kidney disease rather than the picture seen here.

E Sitagliptin

Experience with respect to sitagliptin overdose is minimal, although up to 800 mg was given as a regular dose in early studies without any significant adverse consequences.

A 65-year-old woman is brought into hospital critically ill and with a reduced level of consciousness. Her relatives state she has been increasingly lethargic over the past month and had put on weight. She had been slightly confused, with constipation, and was commenced on antibiotics for a presumed urinary tract infection. She currently takes no regular medication. Her pulse is 55/min, blood pressure 125/98 mmHg, temperature 34 °C, respiratory rate 8/min, oxygen saturations 98% on air.

Examination reveals coarse facial features with dry skin, thin hair and brittle nails.

Initial investigations:

ECG	Sinus bradycardia
Glucose	5.9 mmol/l
Urea	15.2 mmol/l
Na^+	127 mmol/l
K^+	5.8 mmol/l
Creatinine	223 μmol/l

After giving her IV hydrocortisone, which other therapy would you consider?

A	Rapid intravenous fluids
B	Intravenous T3
C	Rapid rewarming
D	Hypertonic saline
E	Demeclocycline

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Your answer was correct

A	Rapid intravenous fluids
B	Intravenous T3
C	Rapid rewarming
D	Hypertonic saline
E	Demeclocycline

Explanation

B Intravenous T3

Myxoedema coma can be the initial presentation of hypothyroidism, but more usually occurs against a background of long-standing disease where patients are unable to comply with their thyroxine replacement. Patients will have a history of cold intolerance, weight gain, increasing lethargy and constipation. Facial features include general coarsening with periorbital oedema and hair thinning. This is an emergency, and treatment involves intravenous thyroxine and slow rewarming. It is also important to take serum for thyroid function and adrenal function. Coexisting hypoadrenalism is suggested by the hyponatraemia, the hyperkalaemia and a raised urea. Patients may also be hypoglycaemic, although that is not the case here. Treatment with hydrocortisone is recommended until Addison's disease can be excluded. It is important to provide hydrocortisone until Addison's is excluded, as just giving thyroid hormone alone may precipitate an adrenal crisis.

A Rapid intravenous fluids

The patient has a normal blood pressure with bradycardia, and therefore there is no indication for aggressive fluid resuscitation. Moreover, she is hyponatraemic, and therefore the correction of sodium levels should be gradual in order to avoid central pontine myelinolysis.

C Rapid rewarming

The patient is hypothermic and she should be rewarmed slowly in order to improve the chance of neurological recovery.

D Hypertonic saline

A 28-year-old woman consults her doctor because of lethargy. She is currently taking fluoxetine for postnatal depression, her child now being 5 months old. Other past history of note is type 1 diabetes mellitus, for which she is using a basal bolus insulin regime. Her thyroid hormone tests reveal a TSH of 7 mU/l (0.4-5.0) and a free T4 of 8.0 pmol/l (10-22). Anti-TPO antibodies are positive.

Which of the following most accurately represents her prognosis?

A	She is likely to progress rapidly to thyrotoxicosis
B	She is more likely to become euthyroid than to remain hypothyroid
C	She is more likely to remain hypothyroid than to become euthyroid
D	Corticosteroids can improve the chances of becoming euthyroid
E	Permanent thyroxine replacement therapy is likely to be needed

18541

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- D Corticosteroids can improve the chances of becoming euthyroid
- E Permanent thyroxine replacement therapy is likely to be needed

Explanation

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Postpartum thyroid dysfunction is said to occur in 5-10% of women during the first year after the birth of a child. Hyperthyroidism is said to occur within the first 4 months of pregnancy, the only symptom of which may be tiredness, with hypothyroidism occurring later, at the 3-7-month stage. Often symptoms are mild and non-specific. Spontaneous recovery occurs in the majority of patients within 6-12 months of delivery, although around 40% eventually go on to develop permanent hypothyroidism. Risk of permanent hypothyroidism isn't closely related to the anti-TPO titre at the end of pregnancy because titres progressively fall during the course of pregnancy.

A	She is likely to progress rapidly to thyrotoxicosis

The hyperthyroid phase presents with non-specific symptoms and may pass undetected. Patients either then become euthyroid or hypothyroid.

C	She is more likely to remain hypothyroid than to become euthyroid

Around 40% of patients develop permanent hypothyroidism.

D	Corticosteroids can improve the chances of becoming euthyroid

In patients with postpartum hypothyroidism, low-dose thyroxine (e.g. 50 µg) may be used to allow for spontaneous recovery to occur with re-checking of thyroid function off therapy after 6 months of treatment. There is no role for corticosteroids in treatment.

Question 29 of 91

You are called to interpret the results of a synacthen test on the Oncology Ward. The patient is a 60-year-old woman who is in hospital for chemotherapy for breast cancer. She has tolerated her therapy poorly and is currently suffering from multiple episodes of vomiting.

On examination, pulse 120/min regular, BP 90/60 mmHg. Her JVP is not seen, her heart sounds are normal and her chest is clear. There is evidence of a right mastectomy. Abdominal and neurological examination is normal.

Short synacthen test:

Time (min)	0	30	60
cortisol (nmol/l)	90	130	145

Given the likely diagnosis, which of the following is the most important component of your immediate management?

A 1 litre IV dextrose over 6

B 1 litre IV normal saline over 12

C Hydrocortisone 100 mg IV BD

D Hydrocortisone oral 20 mg AM, 10 mg PM

E Hydrocortisone 50 mg IV OD

32870

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B	1 litre IV normal saline over 12
C	Hydrocortisone 100 mg IV BD
D	Hydrocortisone oral 20 mg AM, 10 mg PM
E	Hydrocortisone 50 mg IV OD

Explanation

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This patient's rise in cortisol demonstrates an inadequate response to synacthen. The 30 min value should rise above 550 nmol/l. Therefore, this lady has acute adrenal insufficiency. The treatment for this is intravenous saline - at least 6-hourly initially, as her blood pressure is on the low side. Hydrocortisone should be given at a dose of 100 mg IV BD. Lower doses will not be sufficient. Fludrocortisone should be started but is not necessary for emergency treatment. The aetiology of the adrenal insufficiency should be elucidated, but in this lady is likely to be due to metastatic spread, most commonly from a breast or lung primary.

A 1 litre IV dextrose over 6

IV dextrose may further exacerbate any underlying hyponatraemia, and is unlikely to represent adequate fluid replacement for this patient.

B 1 litre IV normal saline over 12

Although normal saline will contribute to total body sodium, this represents an inadequate fluid replacement regimen and won't correct underlying hypoadrenalism.

D Hydrocortisone oral 20 mg AM, 10 mg PM

This is an adequate maintenance regimen for hypoadrenalism, although it is inappropriate here due to vomiting, and because of likely greater corticosteroid requirements due to her intercurrent illness.

E Hydrocortisone 50 mg IV OD

This patient is acutely unwell with a very poor cortisol

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This is an adequate maintenance regimen for hypoadrenalism, although it is inappropriate here due to vomiting, and because of likely greater corticosteroid requirements due to her intercurrent illness.

E	Hydrocortisone 50 mg IV OD

This patient is acutely unwell with a very poor cortisol response to synacthen, and thus higher doses of corticosteroids will almost certainly be required.

Pastest+

Question 30 of 91

A 23-year-old blonde-haired, blue-eyed, tanned lady presents to your clinic. She has had type 1 diabetes for 8 years, and until recently it has been well controlled; however, recently, she has been having numerous hypoglycaemic attacks. These hypos can be at any time of the day and follow no pattern. Her periods are regular. Her BP is 100/60 mmHg with a postural drop of 10 mmHg. She is on a basal bolus regime, taking insulin aspart 8 units three times per day and glargine insulin 15 units at night.

Investigations:

Hb	10.0 g/dl
WCC	6.3 × 10^9/l
PLT	193 × 10^9/l
Na^+	130 mmol/l
K^+	4.4 mmol/l
Creatinine	100 µmol/l
MVC	93 fl
Urea	8.0 mmol/l

Which of the following is most likely to determine the underlying diagnosis?

A	Serum ferritin
B	Paired serum and urine osmolality
C	Continuous glucose monitoring
D	Short Synacthen test
E	Transferrin saturation

Question 30 of 91

BP is 100/60 mmHg with a postural drop of 10 mmHg. She is on a basal bolus regime, taking insulin aspart 8 units three times per day and glargine insulin 15 units at night.

Investigations:

Hb	10.0 g/dl
WCC	6.3 × 10^9/l
PLT	193 × 10^9/l
Na^+	130 mmol/l
K^+	4.4 mmol/l
Creatinine	100 µmol/l
MVC	93 fl
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Which of the following is most likely to determine the underlying diagnosis?

Your answer was correct

A	Serum ferritin
B	Paired serum and urine osmolality
C	Continuous glucose monitoring
D	Short Synacthen test
E	Transferrin saturation

Explanation

Type 1 diabetes is associated with many autoimmune diseases, including Addison's (primary autoimmune adrenal failure). It commonly presents with weight loss and malaise. In patients with diabetes, it presents more commonly as hypoglycaemia. Hyponatraemia is present in 90% and hyperkalaemia in 65%. A normocytic normochromic anaemia is often present, sometimes with an associated eosinophilia.

A Serum ferritin

This patient has normocytic anaemia, which is much more likely to be related to adrenal failure rather than to low iron stores.

B Paired serum and urine osmolality

The presence of unexplained hypoglycaemia in the presence of a low serum sodium steers us more towards adrenal insufficiency, which must be excluded before a diagnosis of syndrome of inappropriate antidiuretic hormone (SIADH) can be considered.

C Continuous glucose monitoring

CGM will confirm a diagnosis of unpredictable hypoglycaemia, although won't contribute to elucidating the cause.

E Transferrin saturation

However, haemochromatosis does present with diabetes mellitus and can be associated with adrenal failure, due to the effect of the menstrual cycle it presents in older women, usually post-menopause.

A 25-year-old postman presents for review. He is 6 feet 4 inches tall and has signs of delayed puberty and infertility on examination, notably small testes with scanty pubic hair.

Investigations:

FSH	35 U/l (1-7)
Testosterone	5 nmol/l (9-35)

Which diagnosis fits best with this clinical picture?

A	47XXY
B	Down syndrome
C	Fragile-X syndrome
D	Hypogonadotropic hypogonadism
E	Kallmann's syndrome

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Which diagnosis fits best with this clinical picture?

Your answer was correct

A	47XXY
B	Down syndrome
C	Fragile-X syndrome
D	Hypogonadotropic hypogonadism
E	Kallmann's syndrome

Explanation

A 47XXY

This is 47XXY, or Klinefelter syndrome. Hypogonadotropic hypogonadism occurs in hypopituitarism, selective gonadotrophin deficiency (e.g. Kallmann syndrome), systemic illness or severe weight reduction. Fragile-X syndrome is associated with macro-orchidism and learning difficulties in males. Klinefelter syndrome affects 1 in 1000

Explanation

A	47XXY

This is 47XXY, or Klinefelter syndrome. Hypogonadotropic hypogonadism occurs in hypopituitarism, selective gonadotrophin deficiency (e.g. Kallmann syndrome), systemic illness or severe weight reduction. Fragile-X syndrome is associated with macro-orchidism and learning difficulties in males. Klinefelter syndrome affects 1 in 1000 males and involves the loss of Leydig cells and seminiferous tubular dysgenesis. Treatment is with androgen replacement unless testosterone levels are normal. No treatment is possible for associated infertility. Chromosomal disorders such as Klinefelter syndrome, which occur due to loss, gain or rearrangement of one or more chromosomes, have no clear pattern of inheritance and carry a low risk of inheritance in relatives.

B	Down syndrome

Down syndrome is caused by trisomy 21 and is of course associated with learning difficulties, rather than the specific features of hypoandrogenism seen here.

C	Fragile-X syndrome

Fragile-X syndrome is associated with learning difficulties and macro-orchidism rather than the small testes seen here.

D	Hypogonadotropic hypogonadism

We can see from the blood results that FSH is significantly elevated, ruling out hypogonadotrophic hypogonadism.

E	Kallmann's syndrome

Chromosomal disorders such as Klinefelter syndrome, which occur due to loss, gain or rearrangement of one or more chromosomes, have no clear pattern of inheritance and carry a low risk of inheritance in relatives.

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E	Kallmann's syndrome

Kallmann syndrome is caused by defective release of GnRH, due to failure of development of the olfactory bulb. LH and FSH are reduced, and patients suffer from anosmia.

32893

Rate this question:

Question 32 of 91

A 64-year-old woman with type II diabetes comes to the clinic for investigation of chronic diarrhoea. She is taking metformin 2.5 g / day and gliclazide 160 mg. Additional medication includes simvastatin 40 mg and aspirin 75 mg.

On examination, she has a body mass index (BMI) of 28 and looks well; abdominal examination is unremarkable. Her blood pressure (BP) is 145/82 mmHg, with no postural drop. There is no evidence of peripheral neuropathy.

Investigations:

Hb	13.9 g/dl
WCC	6.1 × 10^9/l
PLT	229 × 10^9/l
Na^+	139 mmol/l
K^+	4.6 mmol/l
Cr	130 µmol/l
Alb	40 g/l
ALT	35 U/l
ESR	13 mm/hr

Small bowel biopsy normal and colonoscopy is unremarkable.

Which of the following is the most likely diagnosis?

A	Autonomic neuropathy
B	Bile salt malabsorption
C	Chronic pancreatitis
D	Coeliac disease

Question 32 of 91

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Small bowel biopsy normal and colonoscopy is unremarkable.

Which of the following is the most likely diagnosis?

A Autonomic neuropathy

B Bile salt malabsorption

C Chronic pancreatitis

D Coeliac disease

E NSAID related colitis

Explanation

B	Bile salt malabsorption

High-dose metformin is thought to interfere with the enterohepatic circulation of bile salts, leading to reduced reabsorption of bile salts from the ileum. Diarrhoea, in association with metformin therapy, can often be avoided with slow up-titration of the dose.

A	Autonomic neuropathy

Given the lack of peripheral neuropathy and no postural drop in blood pressure, significant autonomic neuropathy is very unlikely.

C	Chronic pancreatitis

Clinically significant chronic pancreatitis is associated with malabsorption. The albumin of 40 counts against significant malabsorption.

D	Coeliac disease

Coeliac disease is associated with anaemia and evidence of malabsorption on biochemistry, neither of which is seen here. The small bowel biopsy effectively rules this out.

E	NSAID related colitis

Abnormalities on colonic biopsy would be expected in patients with NSAID-related colitis.

You see a new patient in a Diabetic Clinic who was started on metformin three years ago. His weight is maintained at around 70 kg. His GP has carried out some routine blood tests, including his HbA_{1c}. The patient has a history of ischaemic heart disease and heart failure, hypertension and chronic kidney disease (serum creatinine: 180 µmol/l, eGFR: 26).

His medications are as follows:

metformin	1 g bd
ramipril	10 mg od
aspirin	75 mg od
clopidogrel	75 mg od
simvastatin	40 mg od
nifedipine	20 mg od
nicorandil	20 mg bd
furosemide	80 mg bd
isosorbide mononitrate	40 mg bd

Venous HbA_{1c} is 108mmol/mol

Which one of the following antidiabetic regimens would you institute?

A	Add in glicazide and pioglitazone
B	Add in glicazide alone
C	Add in pioglitazone alone
D	Add in nocturnal insulin

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Which one of the following antidiabetic regimens would you institute?

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B	Add in glicazide alone
C	Add in pioglitazone alone
D	Add in nocturnal insulin
E	Stop his metformin and start daily insulin

E — Stop his metformin and start daily insulin

Explanation

E — Stop his metformin and start daily insulin

This patient has very poor diabetes control with end organ damage (ischaemic heart disease with heart failure and kidney disease). He already has renal impairment, with an eGFR <30, so metformin is contraindicated and sulfonylureas are not preferable due to the high risk of hypoglycaemia in kidney disease.

A — Add in glicazide and pioglitazone

Gliclazide is not preferable since the use with an eGFR increases the risk of hypoglycaemia. Pioglitazone is contraindicated in heart failure.

B — Add in glicazide alone

Gliclazide is a sulfunyluria and it is best avoided, since an eGFR of 26 increases the risk of hypoglycaemia.

C — Add in pioglitazone alone

Pioglitazone is only indicated as second-line therapy if sulfonylureas are contraindicated, as in this case, but is contraindicated in heart failure.

D — Add in nocturnal insulin

Nocturnal insulin would be useful as an adjunct to oral agents providing basal insulin cover; since the option of oral agents is limited due to possible adverse effects, a

A 32-year-old man who has had diabetes mellitus for 27 years comes to the clinic for review. He has bilateral lower limb sensory loss consistent with peripheral neuropathy and background diabetic retinopathy, but is otherwise well.

Current insulin regime is 8 U TDS of short-acting insulin (Actrapid®) with 20 U/ day of long-acting insulin (Insulotard®). Apart from recurrent nocturnal hypoglycaemia (4 times/week), he feels he is doing well. His BP is 135/70 mmHg, with pulse 80/min and regular. His BMI is 23. HbA1c is 66 mmol/mol (8.2%) and a recent creatinine was measured at 135 micromol/l. Morning glucoses are in the range of 6–22 mmol/l.

Which of the following is the most appropriate change in his regimen?

A	Reduce his Actrapid® by 6 units/day
B	Reduce his Insulotard® by 6 units/day
C	Change his Insulotard® to insulin glargine at 20 units/day
D	Increase his Actrapid® by 6 units/day
E	Change his regime to 12 units of Mixtard® twice/day

56511

C Change his Insulotard® to insulin glargine at 20 units/day

This patient is missing his HbA1c target and suffering nocturnal hypos, as evidenced by his symptoms and some of the morning glucose values (22 mmol/l being potentially reflective of a counter-regulatory response to hypoglycaemia). Because he is missing the HbA1c target, it would not really be appropriate to reduce his insulin dose. Switching to glargine is likely to reduce the risk of hypoglycaemia whilst improving target achievement, because it is a 'peak-less' insulin.

A Reduce his Actrapid® by 6 units/day

The profile of glucose testing suggests possible episodes of hypoglycaemia at night; as such, reducing the dose of Actrapid® won't impact significantly on this patient's glucose control.

B Reduce his Insulotard® by 6 units/day

Given that the HbA1c is above target, this is suboptimal versus switching to an insulin analogue.

D Increase his Actrapid® by 6 units/day

This won't significantly impact on nocturnal hypoglycaemia, but may drive increased food intake and suboptimal weight control.

E Change his regime to 12 units of Mixtard® twice/day

BD mixed insulin is not tailored as appropriately to meal times as a basal bolus regimen and as such it isn't

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E	Change his regime to 12 units of Mixtard® twice/day

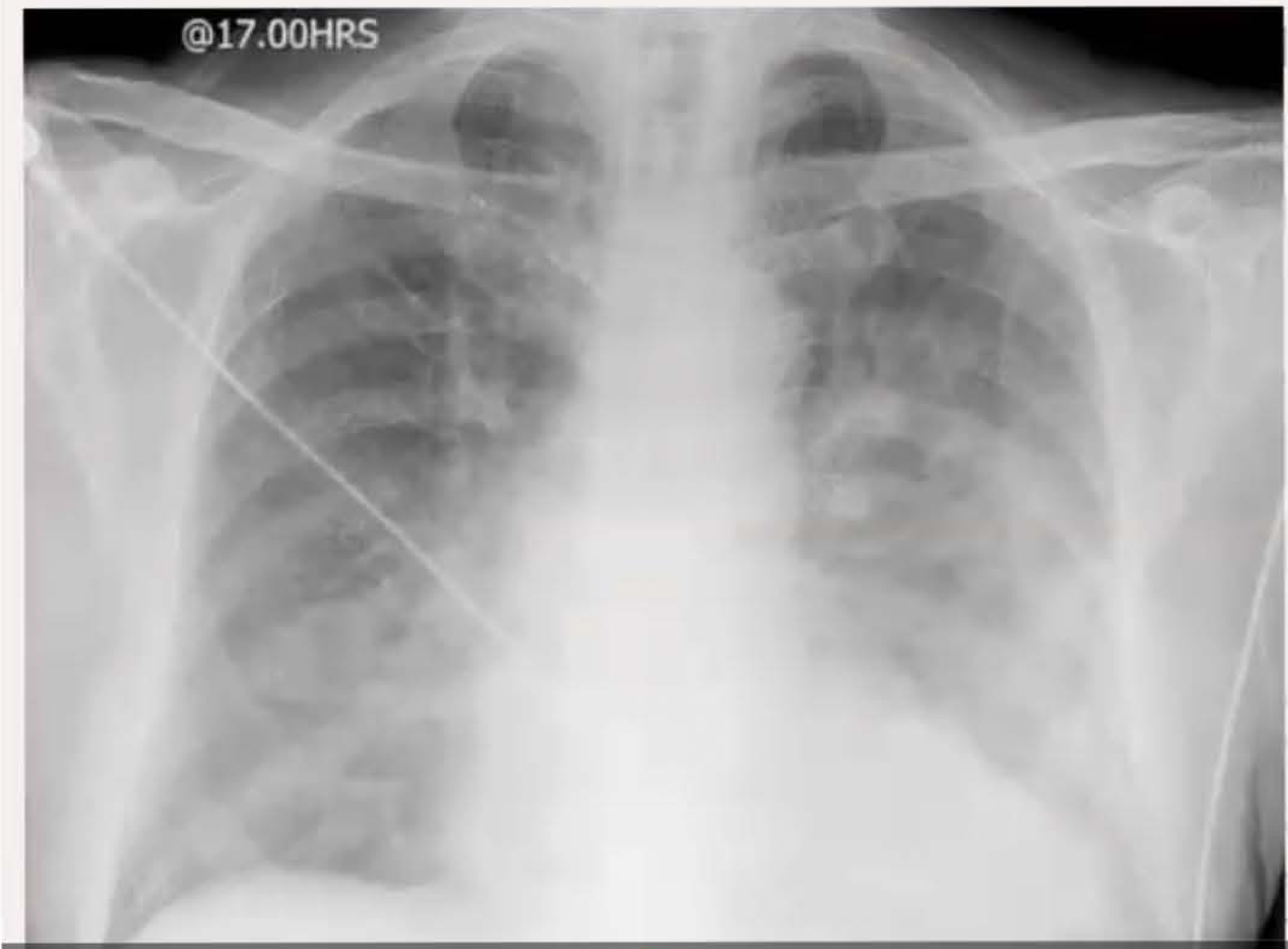
BD mixed insulin is not tailored as appropriately to meal times as a basal bolus regimen, and as such it isn't recommended for patients with type 1 diabetes.

A 57-year-old non-insulin-dependent diabetic man presented to the Emergency Department with sudden onset of shortness of breath. He was commenced on insulin 4 months ago due to persistent hyperglycaemia despite being on metformin 1 g twice daily (bd) and gliclazide 160 mg bd, and the oral medications were continued.

Since being on insulin, he has noticed a weight gain of about 10 kg. He has been a heavy consumer of alcohol and has been treated on multiple occasions for withdrawal symptoms. Other medication includes ramipril, aspirin and atorvastatin.

On examination, he had bilateral pitting oedema up to the knees and facial puffiness. Auscultation revealed bilaterally decreased air entry and widespread crackles. Jugular vein pressure (JVP) was not visualised. Investigations revealed a normal renal, liver and cardiac profile. Electrocardiogram (ECG) was normal. An echocardiogram revealed a slightly reduced ejection fraction.

An admission chest X-ray is shown below.



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Investigations:

Haemoglobin (Hb)	102 g/dl (mean corpuscular volume 104)
White cell count (WCC)	7.1 × 10^9/l
Platelets (PLT)	110 × 10^9/l
Sodium (Na^+)	139 mmol/l
Potassium (K^+)	4.5 mmol/l
Creatinine	90 μmol/l
HbA1c	55 mmol/mol

Which of the following would be the most appropriate management step for this patient?

A	Discontinue insulin
B	Reduce the insulin dosage
C	Fluid restriction
D	Oral furosemide and thiamine supplementation
E	Trial of bisoprolol

52889

D Oral furosemide and thiamine supplementation

This is a well-established but largely under-recognised clinical scenario of insulin-related worsening of heart failure and fluid overload, which occurs because insulin itself promotes salt and water retention. Thiamine deficiency may also have contributed to his heart failure symptoms. Management of choice is with furosemide to promote salt and water excretion, and thiamine in view of his excessive alcohol consumption. Once his fluid status is stable, if he still has symptoms of heart failure, addition of a cardioselective beta blocker such as bisoprolol may be of value.

A Discontinue insulin

HbA1c is virtually at target, and discontinuing insulin risks a significant negative impact on target attainment.

B Reduce the insulin dosage

Reducing the insulin dose without additional blood glucose lowering therapy runs the risk of deterioration in HbA1c.

C Fluid restriction

Fluid restriction alone won't provide sufficient impact on fluid status to reduce symptoms of heart failure.

E Trial of bisoprolol

Beta blockade may improve symptoms of heart failure, but only after fluid overload has been treated with diuretics.

Question 36 of 91

You review a 42-year-old woman who presents with feelings of anxiety. She has lost weight over the past few months and describes palpitations. She has visited her general practitioner (GP) three times over the past six months and been prescribed a selective serotonin uptake inhibitor (SSRI), although her condition continues to worsen. Her blood pressure (BP) is 122/70 mmHg, with pulse 88/min and regular, and she has a fine tremor.

The GP has checked some thyroid function tests:

Thyroid-stimulating hormone (TSH)	0.05 mU/l (0.4–5.0)
Free thyroxine (T_4)	20.1 pmol/l (10–22)
Free triiodothyronine (T_3)	12.5 pmol/l (5–10)

What is the best treatment for this woman's underlying condition?

A Reassurance

B Propranolol

C Paroxetine

D Carbimazole

E Thyroxine

64E1

Question 36 of 91

D Carbimazole

This woman has triiodothyronine (T_3) thyrotoxicosis. Isolated elevation in T_3 accompanied by a thyroxine (T4) in the normal range is associated with around 5% of cases of thyrotoxicosis. Thyrotoxicosis is 10 times more common in women than men in the UK. Prevalence is approximately 2% of the female population, with an annual incidence of 3 per 1000 women. Graves' disease is the commonest cause of thyrotoxicosis; other causes include toxic multinodular goitre and toxic adenoma. Assessment of thyrotoxicosis includes thyroid function tests, thyroid autoantibodies and radionucleotide thyroid scanning, where the diagnosis is uncertain. Carbimazole is the mainstay of initial management of thyrotoxicosis, with propylthiouracil an alternative in patients who fail to tolerate carbimazole or for whom it is unsuitable.

A Reassurance

Reassurance alone is inappropriate here, since with suppressed TSH, T_4 at the upper limit of normal and elevated T_3, this patient has confirmed thyrotoxicosis.

B Propranolol

Although propranolol may be useful for relief of symptoms in the early stages of thyrotoxicosis, use as monotherapy is not appropriate in this situation.

C Paroxetine

Therapy for depression may be required, but her mood should be reassessed once thyroid equilibrium is established.

E Thyroxi

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E Thyroxine

Thyroxine is not indicated, given that TSH is suppressed, T_4 is at the upper end of the normal range and T_3 is elevated.

A 25-year-old woman is attending clinic for follow-up. She has a history of multiple previous fractures and precocious puberty.

On examination, she has café-au-lait skin pigmentation. Her pulse rate is 100 beats/min and regular and she has sweaty palms. Her thyroid function tests showed a raised fT4 at 23.4 pmol/l and a low TSH at 0.09 mIU/l. Her bone profile (calcium, phosphate, ALP, PTH and Vitamin D) is normal.

Which of the following is the most likely pathology?

A Turner syndrome
B Neurofibromatosis type 1
C Paget's disease
D McCune-Albright syndrome
E Osteitis fibrosa cystica

Question 37 of 91

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Which of the following is the most likely pathology?

Your answer was correct

A	Turner syndrome
B	Neurofibromatosis type 1
C	Paget's disease
D	McCune-Albright syndrome
E	Osteitis fibrosa cystica

Explanation

D	McCune-Albright syndrome

McCune-Albright syndrome is due to a mutation in a G-protein. This results in variable clinical presentations:

McCune-Albright syndrome is due to a mutation in a G-protein. This results in variable clinical presentations:

- Precocious puberty (typically gonadotropin-independent). This includes breast development, genital maturation (with or without pubic hair growth), increased height velocity and macroorchidism in males.
- Café-au-lait pigmentation. This consists of spots ranging from light brown to dark brown in colour. These often display a segmental distribution and frequently are predominant on one side of the body without crossing the midline; these spots must be differentiated from those characteristic of neurofibromatosis.
- Polyostotic fibrous dysplasia. Multiple pathological fractures may be prominent early in the history; in many cases, bony involvement is found to predominate clinically on one side; clinical manifestations include gait anomalies, visible bony deformities (including abnormal bone growths of the skull), bone pain and joint stiffness with pain.
- Hyperthyroidism, which in infants can result in failure to thrive.

There is an increased risk of osteosarcoma and other connective tissue tumours, especially if the patient has had multiple radiographs of affected areas. In relation to precocious puberty, the patient is at increased risk of developing breast carcinoma. The increased risk of osteosarcoma is in the setting of polyostotic fibrous dysplasia, although it still has an overall incidence of only around 1%.

C Paget's disease

It is a disorder of bone remodelling with increased osteoclastic activity and bone resorption followed by compensatory osteoblastic activity. The structure of the newly formed bone is disorganized, resulting in weakness and fracture susceptibility. It is more prevalent above the age of 65, and markedly raised ALP is typical with normal calcium and phosphate levels.

E Osteitis fibrosa cystica

This is a skeletal disorder resulting in loss of bone mass, which is replaced with fibrous tissue (peri-trabecular fibrosis) and the formation of cyst-like brown tumours in and around the bone. Osteitis fibrosis cystica is caused by hyperparathyroidism, which stimulates osteoclastic bone resorption. Clinical presentation is one of hyperparathyroidism with the addition of bone fractures. PTH and serum calcium will also be elevated.

An overweight 68-year-old woman with a 5-year history of type 2 diabetes mellitus attends for her annual review. She is currently being treated with metformin (2 g total daily dose).

Investigations:

HbA1C	98.91 mmol/mol (11.2%)
eGFR	24
Creatinine	240 µmol/l
Total cholesterol	7.5 mmol/l

Which of the following represents the most appropriate therapeutic option for this patient?

A Start gliclazide instead of metformin

B Start gliclazide in addition to metformin

C Start insulin and continue metformin

D Start a statin

E Start insulin and stop metformin

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D	Start a statin
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Explanation

E	Start insulin and stop metformin

diabetes are initiated on a twice-daily mixed insulin regime, with conversion to a basal bolus regime as an option if sufficient control is not achieved.

A	Start gliclazide instead of metformin

Her HbA_{1c} is very high, and therefore the initiation of insulin is more appropriate in order to achieve more rapid glycaemic control. In terms of her renal function, gliclazide could cause hypoglycaemia since its clearance will be delayed.

B	Start gliclazide in addition to metformin

Metformin has to be discontinued once eGFR is <30. Gliclazide can be used, but there is the risk of hypoglycaemia

C	Start insulin and continue metformin

Although metformin enhances insulin sensitivity and can be used as adjunctive therapy to insulin, it has to be discontinued in our case since eGFR is <30.

D	Start a statin

The priority is to improve the glycaemic control. Once this is achieved, lipid management with a statin can be considered.

A young woman comes to the clinic with the diagnosis of polycystic ovarian syndrome (PCOS) and decides she would like some treatment. She tells you that her facial hair and acne cause her a great deal of stress. She has a BMI of 23. She is not currently interested in having children and is currently on the oral contraceptive pill (COCP).

Which one of the following would be the most appropriate advice?

A	There is no treatment available
B	Losing weight will significantly impact on her symptoms
C	Clomifene is the most appropriate intervention
D	Metformin is effective in controlling hirsuitism and acne
E	Co-cyprindiol may be more effective than the COCP

70810

Question 39 of 91

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D Metformin is effective in controlling hirsuitism and acne

E Co-cyprindiol may be more effective than the COCP

Explanation

E Co-cyprindiol may be more effective than the COCP

Co-cyprindiol because it contains cyproterone, an anti-androgen, may be more effective than the COCP in controlling acne and hirsuitism and acne in PCOS.

COCP

Explanation

E	Co-cyprindiol may be more effective than the COCP

Co-cyprindiol because it contains cyproterone, an anti-androgen, may be more effective than the COCP in controlling acne and hirsuitism and acne in PCOS.

A	There is no treatment available

Co-cyprindrol may offer incremental benefit versus the COCP alone in managing symptoms of hyperandrogenism.

B	Losing weight will significantly impact on her symptoms

This patient's BMI is in the normal range, hence weight loss is likely to have very little impact on her current symptoms.

C	Clomifene is the most appropriate intervention

Clomifene is used to induce ovulation in PCOS; hence it is not of value here.

D	Metformin is effective in controlling hirsuitism and acne

A Cochrane meta-analysis has suggested that metformin is not effective in controlling hirsuitism and acne versus other options such as the COCP or co-cyprindrol.

A 55-year-old man presents to clinic and complains of tiredness, weakness and loss of body hair. He has recently split up with his partner and he cites loss of sexual function as one reason for this occurring. There is no past medical history of note apart from mild essential hypertension, for which he takes amlodipine.

On examination, pulse is 90/min and BP 100/50 mmHg. He is of normal appearance and has normal secondary sexual characteristics, although his body hair is fine and sparse. He also has bitemporal hemianopia. Routine bloods reveal mildly elevated potassium of 5.5 mmol/l. TSH is in the normal range.

What test would be most useful from those listed?

A	High-dose dexamethasone suppression test
B	Insulin tolerance test
C	Serum prolactin
D	Random serum cortisol
E	Serum glucose

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E	Serum glucose

Explanation

C Serum prolactin

This clinical history is highly suggestive of a pituitary

Explanation

C Serum prolactin

This clinical history is highly suggestive of a pituitary macroadenoma. As the patient is of normal appearance, the differential diagnosis is that of prolactinoma or a non-functioning pituitary adenoma. Therefore, serum prolactin is therefore of great importance. A Synacthen™ test is an adequate measure of cortisol reserve and would be the next most important test. MRI pituitary is important to document the size and invasion of the pituitary tumour, but would be done after a Synacthen™ test and serum prolactin to confirm the diagnosis and evaluate the most appropriate surgical approach.

A High-dose dexamethasone suppression test

A high-dose dexamethasone suppression test is used in the diagnostic workup for Cushing syndrome, which is effectively ruled out here by the normal appearance and normal blood pressure.

B Insulin tolerance test

Insulin tolerance testing is used in the work-up for growth hormone deficiency, which at this stage isn't appropriate until an MRI has taken place and other pituitary hormones have been profiled.

D Random serum cortisol

Cortisol is subject to pulsatile release, and therefore random measurement is not useful in the work-up for possible pituitary tumour.

A 58-year-old woman with a previous psychiatric history presents to the Emergency Department for review with severe left loin pain.

Medication of note includes paroxetine, which was started some 6 months earlier by her GP.

On examination, her BP is elevated at 155/80 mmHg, pulse is 95/min and regular and she is in pain. Examination of the abdomen reveals severe left loin pain.

Investigations:

Hb	13.2 g/dl
WCC	9.9×10^9/l
PLT	188×10^9/l
Na^+	137 mmol/l
K^+	4.2 mmol/l
Creatinine	124 µmol/l
Ca^{++}	3.2 mmol/l
Phosphate	0.7 mmol/l
KUB	Evidence of left renal stones

Which of the following is the most likely diagnosis in this case?

A	Hypoparathyroidism
B	Primary hyperparathyroidism
C	Secondary hyperparathyroidism

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D Multiple myeloma

E Paget's disease

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Your answer was correct

A	Hypoparathyroidism
B	Primary hyperparathyroidism
C	Secondary hyperparathyroidism
D	Multiple myeloma
E	Paget's disease

Explanation

B Primary hyperparathyroidism

In this case, there is confirmed nephrolithiasis and a history of previous psychiatric disorder. In the presence of hypercalcaemia and hypophosphataemia, this is highly suggestive of hyperparathyroidism. The condition occurs

B Primary hyperparathyroidism

In this case, there is confirmed nephrolithiasis and a history of previous psychiatric disorder. In the presence of hypercalcaemia and hypophosphataemia, this is highly suggestive of hyperparathyroidism. The condition occurs most frequently in postmenopausal women, and the prevalence in this group may be as high as 3%. The differential here is between parathyroid hyperplasia and a solitary parathyroid adenoma. Technetium (99mTc) sestamibi scanning has a high specificity and sensitivity for parathyroid adenoma. This patient already has symptoms of primary hyperparathyroidism, so that surgery is the definitive management. A sestamibi scan is most likely to inform on the location of any adenoma prior to a surgical approach.

A Hypoparathyroidism

This is associated with low levels of calcium and elevated phosphate because of PTH deficiency.

C Secondary hyperparathyroidism

Secondary hyperparathyroidism occurs as a result of chronic renal impairment, and creatinine here is relatively normal at 124.

D Multiple myeloma

Multiple myeloma is not associated with renal stone disease, and is rarely associated with significant hypercalcaemia.

E Paget's disease

A Hypoparathyroidism

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C Secondary hyperparathyroidism

Secondary hyperparathyroidism occurs as a result of chronic renal impairment, and creatinine here is relatively normal at 124.

D Multiple myeloma

Multiple myeloma is not associated with renal stone disease, and is rarely associated with significant hypercalcaemia.

E Paget's disease

Paget's disease is associated with normal calcium. Mild elevation in calcium may be seen in patients with Paget's who have prolonged bed rest.

You review a 19-year-old woman who has been referred by the Emergency Department after attending with a faint. She is noted, on routine blood testing in the department, to have a potassium level of 2.9 mmol/l with a serum bicarbonate of 30 mmol/l. In addition, her blood pressure on admission was elevated at 155/90 mmHg. She has no past medical history of note and is on no medications. You arrange some further blood tests, which reveal low renin and aldosterone levels. Urine diuretic screen is negative.

Which of the following represents the best treatment for her?

A Potassium replacement

B Ramipril

C Spironolactone

D Amiloride

E Bumetanide

D Amiloride

This woman presents with a hypokalaemic alkalosis and suppressed renin and aldosterone levels in the presence of hypertension. This is strongly suggestive of Liddle syndrome, an autosomal dominant condition thought to arise from a mutation in genes mapped to chromosome 16. This mutation leads to abnormality in the beta- or gamma-subunit of the highly selective epithelial sodium channel in the distal nephron. This results in activation of sodium/potassium exchange independent of circulating mineralocorticoid. Hypertension and hypokalaemia respond well to amiloride but not spironolactone, because amiloride acts directly on the sodium channel whereas spironolactone acts on the mineralocorticoid receptor. Hypokalaemia and alkalosis in normotensive individuals who have elevated plasma renin and aldosterone levels is suggestive of either Bartter or Gitelman syndrome.

A Potassium replacement

Potassium replacement is of value in the treatment of Bartter and Gitelman, but it isn't an option for Liddle because it doesn't improve blood pressure control.

B Ramipril

Angiotensin-converting enzyme (ACE) inhibition is of most value in the treatment of hyporeninaemic hyperaldosteronism, but it is less effective in the treatment of Liddle compared to amiloride.

C Spironolactone

Spironolactone is an intervention of choice in the treatment of hyporeninaemic hyperaldosteronism.

You review a 52-year-old farmer who rarely consults with medical services. He complains of ocular pain and loss of vision. High magnification slit lamp examination reveals neovascular tufts of capillaries at the pupillary margin. The pupil is poorly reactive. Retinal photography reveals bilateral cotton wool spots, hard exudates, aneurysms and small dot-and-blot haemorrhages. He has a past history of diabetes and hypothyroidism. You suspect rubeosis iridis and subsequent glaucoma. His blood pressure is 135/82 mmHg. The most recent HbA1c is measured at 61 mmol/mol, and his TSH is 2.5.

Which of the following is the most important preventative intervention to reduce the risk of glaucoma in this patient?

A Tighter control of blood pressure

B Tighter control of blood glucose

C Increased thyroxine dose

D Pan-retinal photocoagulation

E Oral acetazolamide

Question 3 of 51

Explanation

D Pan-retinal photocoagulation

An important part of the work-up of rubeosis iridis is with fluorescein angiography to assess the extent of retinal ischaemia, and ultrasound. Once eye disease has progressed to rubeosis, the mainstay of therapy is pan-retinal photocoagulation to reduce the area of viable retina. Anti-VEGF agents and topical steroids may also be of value, but ultimately the prognosis is poor because of late stage at presentation.

B Tighter control of blood glucose

HbA1c, like blood pressure, is only slightly above target, hence any impact of tightening of blood glucose control on disease progression will be limited.

A Tighter control of blood pressure

There is limited scope to further improve blood pressure control here, and the patient already has advanced retinal disease, meaning any impact of improved blood pressure control on disease progression will be limited.

C Increased thyroxine dose

TSH is in the normal range, meaning there is gain to be had from increasing thyroxine.

E Oral acetazolamide

This is a potential intervention for acute glaucoma.

Rate this question:

rubeosis iridis

Rubeosis iridis or neovascularization ...
webeye.ophth.uiowa.edu

Rubeosis iridis or neovascularization ...
webeye.ophth.uiowa.edu

Rubeosis iridis in a case of PDR a ...
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Ophthalmology spot diagnosis : Rubeosis ...
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A 29-year-old woman presents with tiredness and a swollen neck. You notice she is with a 6-week-old baby. She has a goitre on examination of the neck.

Investigations:

TSH	0.3 mU/l (0.4-5)
Total T4	199 nmol/l (58-174)
Total T3	3.31 pmol/l (1.07-3.18)
Free T4	46 nmol/l (10-22)
Free T3	2.1 pmol/l (5-10)

Radioiodine uptake is not increased on thyroid scanning. What diagnosis fits best with this clinical picture?

A Post-partum thyroiditis (PPT)

B Grave's disease

C Anxiety

D Riedel's thyroiditis

E Hashimoto's thyroiditis

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Explanation

A Post-partum thyroiditis (PPT)

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A Post-partum thyroiditis (PPT)

PPT is a variant of chronic autoimmune thyroiditis (Hashimoto's thyroiditis), and is characterised by the presence of antimicrosomal antibodies. Histological examination of thyroid glands affected by PPT shows destructive lymphocytic thyroiditis. Hyperthyroidism may occur within 4 months of delivery, the commonest symptom being fatigue. Hypothyroidism may develop within 3-7 months of delivery; again, the commonest symptom is tiredness. Postpartum thyroid dysfunction is said to occur in up 10% of women during the first year after delivery.

E Hashimoto's thyroiditis

Hashimoto's thyroiditis is accompanied by hypothyroidism, and the thyroid function tests in our case are consistent with the opposite (hyperthyroidism).

B Grave's disease

Postpartum hyperthyroidism is differentiated from Graves' disease by a lack of increased uptake on thyroid scanning.

C Anxiety

The abnormal thyroid function tests point towards the diagnosis of thyrotoxicosis rather than simply anxiety symptoms.

D Riedel's thyroiditis

Riedel thyroiditis, or Riedel's thyroiditis (RT), is a rare,

nephropathy, with a recent creatinine measured at 180 µmol/l, and microalbuminuria. Last year he received laser treatment to his left eye for severe retinopathy. He is currently treated with a Novomix 30 at a dose of 12 units BD. A recent HbA1c was measured at 59.56 (7.6%). You review his home glucose record and find that 2 h postprandial glucose is high, at 12 mmol/l, yet he appears to be suffering attacks of hypoglycaemia late in the afternoon before his evening meal, and occasionally before breakfast. His BMI is 22.

Which of the following represents the best advice with respect to his treatment irrespective of patient preference?

Your answer was correct

A Reduce his portion size in an attempt to take in fewer calories

B Alter his insulin to a basal bolus regime involving glargine and aspart

C Increase his BD insulin to 14 units

D Increase the proportion of short-acting insulin in his mixed insulin dose

E Advise him to snack more in the middle of the afternoon and prior to going to bed

Explanation

glargine and aspart

This man has documented microvascular disease with proven retinopathy and nephropathy. In this population, optimal glycaemic control would be indicated by an HbA1c of 47.54 mmol/mol (<6.5%) if possible. Novorapid, as a short-acting insulin, and glargine as an insulin analogue are associated with less hypoglycaemia, would be the most appropriate choice for him.

A Reduce his portion size in an attempt to take in fewer calories

Reducing his portion size may impact on his postprandial blood glucose levels but will increase the risk of late hypoglycaemia.

C Increase his BD insulin to 14 units

Increasing his BD insulin would only exacerbate the problem of late between-dose hypoglycaemia.

D Increase the proportion of short-acting insulin in his mixed insulin dose

This may improve his postprandial blood glucose levels but may increase the risk of hypoglycaemia.

E Advise him to snack more in the middle of the afternoon and prior to going to bed

Snacking, but remaining on BD insulin, would only serve to increase his total energy intake and may worsen his glycaemic control.

A 38-year-old physiotherapist attended for a routine follow-up in the Diabetes Clinic. She was diagnosed with type 1 diabetes mellitus at the age of 11 and unfortunately had a history of both diabetic maculopathy and early diabetic nephropathy with microalbuminuria.

She complained of a 6-week history of raised, tender plaques over the shins (shown below) and, on further questioning, described painful wrists and ankles for the past 6 months.

By Warfieldian [CC BY-SA 3.0 (https://creativecommons.org/licenses/by-sa/3.0)], from Wikimedia Commons

Examination confirmed the presence of the plaques, over which there was clear skin thinning and telangiectasia. Her blood pressure is 147/84 mmHg. A urine dipstick revealed protein +1 and glucose +1.

What is the most useful next investigation?

A	Anti-nuclear antibody testing
B	Anti-cyclic citrullinated peptide (CCP) antibody testing
C	Serum complement measurement
D	Ankle and wrist X-ray
E	Immunoglobulin E (IgE) measurement

B Anti-cyclic citrullinated peptide (CCP) antibody testing

Anti-CCP is specific for rheumatoid arthritis, the most probable diagnosis here, and may be positive in advance of any joint destruction. It also stratifies those with rapid disease progression. It is therefore the most useful next step.

D Ankle and wrist X-ray

The plaques are probably unconnected to the wrist and ankle pain but are due to necrobiosis lipoidica diabeticorum. The condition is more common in women and presents in young adults or in early middle life. These erythematous plaques are due to small vessel damage causing partial necrosis of the dermal collagen and connective tissue, with a resulting histiocytic cellular response. The lesions are usually managed with support bandaging and use of topical steroids. The wrist and ankle pain is suggestive of possible arthritis. Both rheumatoid arthritis and type 1 diabetes may be associated with the human leukocyte antigen HLA-DR4.

Although ankle and wrist X-rays are useful in defining rheumatoid arthritis, the absence of changes should not delay treatment. Hence, CCP testing is potentially more useful at this stage of the disease.

A Anti-nuclear antibody testing

Anti-nuclear antibody testing is useful when systemic lupus erythematosus (SLE) is considered as the underlying diagnosis, although given that joint pains are limited to the wrists and ankles and there is an absence of a photosensitive rash, this is less likely vs a new diagnosis of rheumatoid arthritis.

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Anti-nuclear antibody testing is useful when systemic lupus erythematosus (SLE) is considered as the underlying diagnosis, although given that joint pains are limited to the wrists and ankles and there is an absence of a photosensitive rash, this is less likely vs a new diagnosis of rheumatoid arthritis.

C Serum complement measurement

Necrobiosis lipoidica is not associated with generalised complement activation, and so this parameter is likely to be normal.

E Immunoglobulin E (IgE) measurement

Necrobiosis lipoidica is associated with neither Churg-Strauss vasculitis nor generalised hypersensitivity, and thus IgE measurement has little utility here.

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A 28-year-old woman presents to her GP complaining of tiredness and malaise, which came on after a short viral illness. She also has pain which appears to be referred to her lower jaw. On examination of the neck the GP notices that the thyroid gland appears to be generally tender and is nodular on palpation. TSH is measured at <0.05 mU/l (0.4-5.0), ESR is raised at 45 mm/h and a technetium scan reveals decreased thyroid uptake.

Which of the following is the most likely diagnosis?

A	Hashimoto's thyroiditis
B	Riedel's thyroiditis
C	Graves' disease
D	de Quervain's Thyroiditis
E	Pyogenic thyroiditis

De Quervain's thyroiditis is the most common cause of a painful thyroid gland and causes hyperthyroidism initially, sometimes followed by transient hypothyroidism. The underlying cause is felt to be either a viral infection or the postviral inflammatory response. The condition is more common in females. The typical course of the disease consists of an acute phase, in which the main complaint is pain, although signs of hyperthyroidism may also be present. This is followed by a transient asymptomatic and euthyroid phase which evolves into the hypothyroid phase. The hypothyroid state may become permanent in 5–10% of patients, but the vast majority go on to the recovery phase, characterised by normalisation of thyroid structure and function. The treatment is consequently directed towards the control of pain and thyroid symptoms. Initial symptomatic hyperthyroidism can be treated with beta-blockade, but anti-thyroid drugs are of no value since the excess circulating thyroid hormone is due to the release of pre-existing thyroid hormone because of follicular damage rather than from increased synthesis. If hypothyroidism occurs in the late stages, replacement therapy is required and is guided by the TSH levels. Radionucleotide scanning reveals decreased uptake from the thyroid gland.

A Hashimoto's thyroiditis

Hashimoto's presents with symptoms of hypothyroidism. On examination there is often a hard goitre which is non-tender. Anti-thyroid peroxidise antibodies are usually raised.

B Riedel's thyroiditis

Riedel's thyroiditis is characterised by intense fibrosis of

tender. Anti-thyroid peroxidise antibodies are usually raised.

B Riedel's thyroiditis

Riedel's thyroiditis is characterised by intense fibrosis of the gland. Most patients remain euthyroid. Symptoms of tracheal compression can occur.

C Graves' disease

Radionucleotide scanning is useful in distinguishing between Graves' and other causes of thyrotoxicosis: it will show increased uptake in the whole gland in Graves' disease.

E Pyogenic thyroiditis

Pyogenic thyroiditis is rare and is associated with a pyogenic infection elsewhere. Patients can present with pain and swelling in the neck. and fever. TFTs are often normal.

Question 8 of 51

A 17-year-old boy attends the clinic. He is worried as he has failed to enter puberty. He would like to form relationships with women but at the current time this is impossible. On examination he is 6ft 2 inches in height and has absent secondary sexual hair, a small penis and testes. On further questioning he admits to not having any sense of smell to speak of.

Investigations

Hb	12.1 g/dl
WCC	6.2 x 10^9/l
PLT	231 x 10^9/l
Na^+	139 mmol/l
K+	4.5 mmol/l
Creatinine	100 µmol/l
Testosterone	Very low
FSH	Low
LH	Low

Given the likely diagnosis, what appearance would you expect to see on cerebral magnetic resonance imaging (MRI)?

A Normal result

B Hypothalamic damage on MRI

C Empty sella

D Absent olfactory bulbs

Hb	12.1 g/dl
WCC	6.2×10^9/l
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Given the likely diagnosis, what appearance would you expect to see on cerebral magnetic resonance imaging (MRI)?

A	Normal result
B	Hypothalamic damage on MRI
C	Empty sella
D	Absent olfactory bulbs
E	Hypertrophied olfactory bulbs

D	Absent olfactory bulbs

Absent olfactory bulbs, correct. This boy is likely to have Kallmann syndrome, as evidenced by hypogonadotrophic hypogonadism and absent sense of smell. Absent olfactory bulbs are present on 75% of MRI scans in these patients. The syndrome results in an isolated gonadotrophin (GNRH) deficiency and, in turn, gonadal deficiencies. This causes loss of libido, loss of secondary sexual hair and amenorrhoea/erectile dysfunction.

B	Hypothalamic damage on MRI

This patient should be managed with androgen replacement therapy. Fertility can be restored in the majority of patients with either pulsed GNRH or gonadotrophin therapy. Assessment of bone age and bone mineral density is also essential in these patients.

A	Normal result

Although with this condition the absence of olfactory bulbs is more common. This is because Kallman syndrome is usually an x-linked mutation in the KAL-1 gene which encodes anosmin-1, causing loss of smell.

C	Empty sella

This is more often associated with a defect in the diaphragm and extension into the subarachnoid space (a congenital abnormality), following a pituitary infarction or pituitary tumour treatment.

E	Hypertrophied olfactory bulbs

al T2 image of the case with Kallmann syndrome. Normal olfactory... | oad Scientific Diagram

l scientific diagram | Coronal T2 image of the case with Kallmann syndrome. Normal olfactory sulcu light arrow), olfactory sulcus was not seen on the left. Olfactory...

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M S Gopalakrishnan: Spontaneous CSF rhinorrhea - MRI CISS images - cribriform plate defect

25 year old lady with four months history of profuse watery discharge from right nostril. Anosmia in right nostril. No raised ICP feature...

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Question 9 of 51

A 29-year-old woman, who has a 10-month-old baby, presents with neck and throat pain over the area of her thyroid. She tells you that she had a flu-like illness a week or so before the pain began. Her partner, who also attends the appointment, tells you she has been nervous and agitated over the past week. On examination, there is mild diffuse enlargement of the thyroid gland and it is tender to palpation. Her BP is 141/82 mmHg, and her pulse is 85/min and regular at rest. She has a slight tremor.

Investigations:

Hb	12.1 g/dl
WCC	6.1 $\times 10^9$/l
PLT	170 $\times 10^9$/l
Na^+	139 mmol/l
K^+	4.6 mmol/l
Creatinine	100 µmol/l
TSH	<0.05 U/l
Anti-TPO	-
ESR	62 mm/hr
fT4	24.3 pmol/l

Radioiodine uptake on the isotope scan is decreased.

Which of the following forms of thyroiditis is the most likely diagnosis?

A Hashimoto's

B De Quervain's

Question 9 of 51

Hb	12.1 g/dl
WCC	6.1 x10⁹/l
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A	Hashimoto's
B	De Quervain's
C	Riedel's
D	Graves'
E	Postpartum

Explanation

B De Quervain's

De Quervain's thyroiditis, also known as subacute thyroiditis, is characterised by acute onset of thyroid tenderness after a short viral illness, with raised ESR but negative anti-thyroid antibodies. It is thought to be linked to a response to viral infection, although a range of different viruses such as influenza and Coxsackie B have been implemented in its development. The early stages are characterised by a period of thyrotoxicosis, and radioisotope scanning reveals decreased thyroid uptake. As the disease progresses, there are phases of euthyroidism and hypothyroidism, followed by a period of recovery to a euthyroid state once again. Management centres on controlling pain, with either non-steroidals or corticosteroids, and managing the symptoms of thyrotoxicosis, normally with beta blockade.

A Hashimoto's

Hashimoto's thyroiditis, also known as chronic lymphocytic thyroiditis, is an autoimmune disease in which the thyroid gland is gradually destroyed. Early on there may be no symptoms. Over time the thyroid may enlarge, forming a painless goitre. Some people eventually develop hypothyroidism with its accompanying weight gain, feeling tired, constipation, depression and general pains. The thyroid function tests in this scenario are in keeping with thyrotoxicosis. It is very unusual for Hashimoto's thyroiditis to present with negative anti-TPO antibodies. Neither is pain in the neck a feature of the disease.

C Riedel's

Riedel's thyroiditis, also known as chronic sclerosing thyroiditis, is a rare chronic inflammatory disease of the

immunoglobulins bind to and activate thyrotropin receptors, causing the thyroid gland to grow and the thyroid follicles to increase synthesis of thyroid hormone. Graves' disease, along with Hashimoto's thyroiditis, is classified as an autoimmune thyroid disorder. In some patients, Graves' disease represents part of more extensive autoimmune processes leading to dysfunction of multiple organs (e.g. polyglandular autoimmune syndromes). Graves' disease is associated with pernicious anaemia, vitiligo, diabetes mellitus type 1, autoimmune adrenal insufficiency, systemic sclerosis, myasthenia gravis, Sjögren syndrome, rheumatoid arthritis and systemic lupus erythematosus. Painful goitre or neck pain with flu-like symptoms is not a characteristic of this condition.

E Postpartum

The peak incidence for postpartum thyroiditis is at month 6 post-delivery. There is an initial period of thyrotoxicosis, followed by hypothyroidism, then recovery, although a significant percentage - perhaps as high as 40% - eventually become permanently hypothyroid. Flu-like symptoms are not a feature.

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A 72-year-old man presents to the endocrine clinic for review. He has been taking amiodarone for the past few months for short episodes of VT diagnosed after a myocardial infarction.

During the past 2 months, he has noticed weight loss and heat intolerance, with short runs of an irregular, fast heartbeat. In the clinic he has a BP of 112/82, pulse is 88 and regular. His BMI is 21. Thyroid function testing is abnormal, with a suppressed thyroid-stimulating hormone (TSH) suggestive of thyrotoxicosis. Radioiodine uptake scan is normal, as is serum interleukin 6 (IL-6). A most recent ECHO cardiogram is 38%.

His amiodarone is discontinued by the cardiologist after the repeat ECHO cardiogram and a 72 h tape, which shows paroxysmal AF but no episodes of VT.

Which one of the following options is the best initial therapy for him?

A Prednisolone 40 mg/day

B Carbimazole and potassium perchlorate therapy

C Thyroidectomy

D Radioiodine

E Partial thyroidectomy

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B Carbimazole and potassium perchlorate therapy

C Thyroidectomy

D Radioiodine

E Partial thyroidectomy

Explanation

B Carbimazole and potassium perchlorate therapy

B Carbimazole and potassium perchlorate therapy

This man probably has amiodarone-induced thyrotoxicosis (AIT) type 1, as exemplified by the presence of symptoms of thyrotoxicosis, normal radioiodine uptake and normal interleukin 6 (IL-6) levels. AIT type 1 results primarily from iodine excess and therefore increased hormone synthesis. Type 1 AIT is treated initially with a combination of anti-thyroid drugs and potassium perchlorate therapy.

A Prednisolone 40 mg/day

Prednisolone is a component of therapy for AIT type 2, which is thought to result from a direct toxic effect of amiodarone and is associated with thyroiditis, decreased radioiodine uptake on thyroid scan and raised IL-6 levels. Patients may eventually become hypothyroid because of the destruction of thyroid hormone-producing cells.

C Thyroidectomy

Surgery should be avoided if possible in a patient with relatively unstable cardiovascular disease; in the event that it is required, acute control of thyroid status is first achieved with perchlorate therapy. It may be considered particularly in cases where amiodarone cannot be withdrawn.

D Radioiodine

Radioiodine is ineffective at least initially in amiodarone-induced thyrotoxicosis, because of the iodine load already delivered by amiodarone therapy.

E Partial thyroidectomy

Amiodarone Treatment

Low TSH

- Symptomatic
  - High FT4/T4
  - Normal or High T3
    - **Type-I AIT** (Jod Basedow Phenomenon)
      1. Stop amiodarone,
      2. High Dose ATD,
      3. Potassium Perchlorate,
      4. I-131 in iodine depleted area,
      5. Thyroidectomy
    - **Type-2 AIT** (Destructive thyroiditis)
      1. Stop Amiodarone
      2. Steroid for membrane stabilization,
      3. Lithium to reduced hormone release
- Asymptomatic
  - F/up clinically 4 weekly

High TSH (Wolff Chaikoff Phenomenon)

- High TSH, Low FT4/T4?T3
- Positive thyroid Ab (40%)
  1. Stop Amiodarone,
  2. Thyroid replacement therapy (if symptoms persist)

Figure: Algorithm showing management of amiodarone induced thyroid disorders.

Journal Of Pakistan Medical Association

JPMA - Journal Of Pakistan Medical Association

Normalization of thyroid function may be delayed due to prolonged elimination life of amiodarone and also due to pre-existing autoimmune thyroid disorder.

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A 40-year-old woman is referred to the Endocrine Clinic complaining of an 8-month history of constant sweating and occasionally being feverish. She found her recent summer holiday to Turkey unbearable and had to return to the UK early. She has also noticed that she has lost weight over the last year, though her appetite remains fine. On examination, she was afebrile but tachycardic. Her palms were sweaty. No goitre was palpable. There was no cervical lymphadenopathy. Routine FBC, U&E and LFT are normal.

What is the most likely diagnosis?

A	Hodgkin's lymphoma
B	Non-Hodgkin's lymphoma
C	Thyrotoxicosis
D	Infection – undefined organism
E	Phaeochromocytoma

2352

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Your answer was correct

A	Hodgkin's lymphoma
B	Non-Hodgkin's lymphoma
C	Thyrotoxicosis
D	Infection - undefined organism
E	Phaeochromocytoma

Explanation

C Thyrotoxicosis

Episodic bouts of sweating may be due to hypoglycaemia, phaeochromocytoma or carcinoid. However, a patient

Explanation

C	Thyrotoxicosis

Episodic bouts of sweating may be due to hypoglycaemia, phaeochromocytoma or carcinoid. However, a patient reporting night sweats suggests a diagnosis of Hodgkin's disease or tuberculosis. Hodgkin's disease tends to feature localised lymphadenopathy, weight loss, pruritus and fever.

Patients with thyrotoxicosis report constant sweating and heat intolerance. There may be no evidence of enlargement of the thyroid gland.

Taking her age and sex into account, thyrotoxicosis is the most likely diagnosis.

A	Hodgkin's lymphoma

Hodgkin's disease tends to feature localised lymphadenopathy, weight loss, pruritus and fever, splenomegaly and/or hepatomegaly. In our case, the physical examination is not in keeping with Hodgkin's lymphoma.

B	Non-Hodgkin's lymphoma

Signs and symptoms of low-grade non-Hodgkin's lymphomas are:

- peripheral adenopathy: painless and slowly progressive; can spontaneously regress
- primary extra-nodal involvement and B symptoms: uncommon at presentation; however, common with

Apart from the weight loss and the sweats, there are no other symptoms which would point towards an infection. Moreover, the FBC is normal (no neutrophilia, or lymphocytosis in the case of viral infections). Also, liver function tests are normal, which precludes hepatitis or Epstein-Barr. The natural history of the disease is also too long (8 months).

E Phaeochromocytoma

Classically, pheochromocytoma manifests as spells with the following four characteristics:

- headaches
- palpitations
- diaphoresis
- severe hypertension.

In our scenario, apart from weight loss and sweating, which are non-specific, there is nothing else pointing towards a diagnosis of phaechromocytoma.

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A 32-year-old woman presents to the GP complaining of lethargy. She works in the local pharmacy and has had to ask for increasing amounts of time off work. Apparently there is no past medical history of note, apart from some trouble due to an eating disorder as a teenager. On examination she looks normal, her blood pressure is 125/72 mmHg and BMI is 20.

Investigations:

Hb	12.1 g/dl
WCC	4.6 $\times 10^9$/l
PLT	200 $\times 10^9$/l
Na^+	134 mmol/l
K^+	3.1 mmol/l
Creatinine	90 μmol/l
Bicarbonate	34 mmol/l

Which of the following is the most likely diagnosis?

A	Bartter syndrome
B	Gitelman syndrome
C	Conn's syndrome
D	Thiazide abuse
E	Liddle's syndrome

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- B Gitelman syndrome
- C Conn's syndrome
- D Thiazide abuse
- E Liddle's syndrome

Explanation

D Thiazide abuse

This patient works in a pharmacy, so it is possible she has access to medicine, and we hear she has a history of an

E Liddle's syndrome

Explanation

D Thiazide abuse

This patient works in a pharmacy, so it is possible she has access to medicine, and we hear she has a history of an eating disorder as a teenager. Thiazide abuse would result in exactly this picture, with normal BP, hypokalaemia and high bicarbonate.

A Bartter syndrome

Bartter syndrome may present with a similar biochemical picture, although access to diuretics given she works in a pharmacy is much more likely to be the cause of her symptoms.

B Gitelman syndrome

Although Gitelman syndrome may also present with hypokalaemic metabolic alkalosis, it differs from Bartter in that it is associated with reduced calcium excretion.

C Conn's syndrome

Primary hyperaldosteronism is associated with hypertension, hypokalaemia and metabolic alkalosis, rather than the normal blood pressure seen here.

E Liddle's syndrome

Liddle syndrome is associated with hypertension, and hence cannot be the diagnosis here. It is caused by a

An 18-year-old woman is referred by her general practitioner to the Endocrine Clinic complaining of excessive hairiness. She is particularly concerned as this affects her face and the upper part of her chest. Her periods have been irregular ever since they began at the age of 12. Her body mass index (BMI) is 28. Testosterone level is measured at 3.2 nmol/l (0.5-3.0) and there is a raised luteinising hormone/follicle-stimulating hormone (LH/FSH) ratio.

What is the best long-term management for this lady?

A	Weight loss
B	Pioglitazone
C	Combined oral contraceptive pill
D	Metformin
E	Cyproterone acetate and ethinyloestradiol

6462

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Your answer was correct

A Weight loss
B Pioglitazone
C Combined oral contraceptive pill
D Metformin
E Cyproterone acetate and ethinyloestradiol

Explanation

A Weight loss

This woman has evidence of polycystic ovarian syndrome (PCOS) as evidenced by her clinical presentation, moderately raised testosterone level and reversal of the LH/FSH ratio. Given that her elevated BMI is approaching the obese range, the best management is loss of weight.

Explanation

A Weight loss

This woman has evidence of polycystic ovarian syndrome (PCOS) as evidenced by her clinical presentation, moderately raised testosterone level and reversal of the LH/FSH ratio. Given that her elevated BMI is approaching the obese range, the best management is loss of weight. Loss of weight leads to decreased insulin resistance, increases in sex hormone-binding globulin (SHBG) and reduction in levels of free androgens. A 5% weight loss is said to result in a 40% improvement in hirsuitism. It will also significantly reduce the risk of developing type 2 diabetes over the longer term.

B Pioglitazone

The insulin sensitiser pioglitazone improves insulin sensitivity and restores ovulatory function in a significant number of patients with PCOS. It is, however, usually avoided over the long term because of adverse effects including weight gain, fluid retention and decreased bone mineral density.

C Combined oral contraceptive pill

Although the pill will regularise the menstrual cycle and improve hirsutism, over the longer term weight loss is more beneficial with respect to the patient's health.

D Metformin

Like pioglitazone, metformin reduces insulin resistance and has a modest effect on weight reduction in women with PCOS.

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D	Metformin

Like pioglitazone, metformin reduces insulin resistance and has a modest effect on weight reduction in women with PCOS.

E	Cyproterone acetate and ethinyloestradiol

Cyproterone acetate and ethinyloestradiol do reduce hirsuitism, although where patients can manage to lose weight this is the preferred intervention, accompanied by electrolysis.

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A 32-year-old woman who has been diagnosed with a phaeochromocytoma by the general physicians visits you for a specialist endocrinology appointment. She is on adrenergic blockade with phenoxybenzamine and is awaiting surgery. They are concerned as her calcium is elevated, at 2.75 mmol/l. On examination her BP is elevated at 148/88 mmHg. You feel a hard mass on the right-hand side of the thyroid.

Which test is most important for confirming the diagnosis?

A	Tc-sestamibi parathyroid scan
B	Pentagastrin stimulation test
C	Ultrasound of the neck
D	Random calcitonin
E	PTH assay

A 32-year-old woman who has been diagnosed with a phaeochromocytoma by the general physicians visits you for a specialist endocrinology appointment. She is on adrenergic blockade with phenoxybenzamine and is awaiting surgery. They are concerned as her calcium is elevated, at 2.75 mmol/l. On examination her BP is elevated at 148/88 mmHg. You feel a hard mass on the right-hand side of the thyroid.

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Your answer was incorrect

A	Tc-sestamibi parathyroid scan
B	Pentagastrin stimulation test
C	Ultrasound of the neck
D	Random calcitonin
E	PTH assay

Explanation

B	Pentagastrin stimulation test

There is a high index of suspicion that this patient has MEN-2a, and she may well have both parathyroid hyperplasia and medullary thyroid carcinoma. Medullary thyroid carcinoma is the most important diagnosis to confirm, with the pentagastrin test the best way to do this. It measures calcitonin levels at 2 and 5 minutes, however, and a rise in calcitonin is suggestive of medullary thyroid carcinoma

B Pentagastrin stimulation test

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E PTH assay

PTH may be elevated, but wouldn't confirm or refute an underlying diagnosis of medullary thyroid carcinoma.

A Tc-sestamibi parathyroid scan

Parathyroid hyperplasia is much commoner than medullary thyroid carcinoma, and it's most important to confirm or refute medullary thyroid carcinoma and hence MEN-2a.

C Ultrasound of the neck

Ultrasound of the neck is relatively insensitive with respect to identifying small neck masses, and doesn't provide a biochemical diagnosis.

D Random calcitonin

Random calcitonin is much less sensitive versus pentagastrin-stimulated calcitonin to identify medullary thyroid carcinoma.

Pentagastrin stimulation test

Pentagastrin is also used as a stimulation test to elevate of several hormones, such as serotonin. It provokes flushing and is useful in evaluating patients who describe flushing, but have normal or only marginally elevated biochemical markers for carcinoid syndrome.

It has been used to stimulate ectopic gastric mucosa for the detection of Meckels diverticulum by nuclear medicine.

Calcitonin test

The **pentagastrin-stimulated calcitonin test** is a diagnostic test for medullary carcinoma of the thyroid (MTC). MTC is a malignancy of the calcitonin-secreting cells of the thyroid gland, and thus MTC is commonly associated with an elevated calcitonin level, but an elevated level may not always be obvious. The pentagastrin-stimulated calcitonin test is useful in cases of suspected MTC that are not associated with elevated calcitonin. In these patients, injecting pentagastrin will cause calcitonin levels to rise significantly above the normal or basal range.[4] After a total thyroidectomy for medullary thyroid carcinoma, the pentagastrin-stimulated calcitonin release can be used to detect

You review a 52-year-old man who describes having undergone pituitary surgery (and 'some treatment' after the operation), a while ago. He now complains of feelings of lethargy, reduced energy and vitality.

On examination, he has increased central abdominal adiposity and has reduced grip strength. He is already taking thyroid and cortisol replacement, and blood testing suggests these are adequate. Full blood count (FBC), urea and electrolytes (U&E) and liver function tests (LFTs) are unremarkable.

Which of the following would be the best investigation to perform next?

A Magnetic resonance imaging (MRI) of the pituitary fossa

B Insulin tolerance test

C Glucose tolerance test

D Serum prolactin

E Serum insulin-like growth factor-1 (IGF-1)

71108

E | Serum insulin-like growth factor-1 (IGF-1)

In light of this man's previous pituitary surgery, it is possible that he has growth hormone (GH) deficiency. Clinical features of growth hormone deficiency include impaired well-being, reduced energy and vitality, reduced muscle mass and exercise tolerance, decreased sweating, increased cardiovascular risk and increased fracture risk (osteoporosis). A serum IGF-1 concentration lower than the lower limit of normal in a patient who has pituitary disease confirms the diagnosis of GH deficiency. Even a normal value does not exclude GH deficiency; further investigations would be indicated here.

B | Insulin tolerance test

Insulin tolerance testing to induce hypoglycaemia is a potential option for investigation, although this is unpleasant for the patient. Other options, such as the arginine-growth hormone-releasing hormone test, are preferred where these are available now.

A | Magnetic resonance imaging (MRI) of the pituitary fossa

We know that pituitary anatomy is likely to be abnormal in relation to previous surgery, and further imaging won't inform as to abnormalities of gland function.

C | Glucose tolerance test

Oral glucose tolerance testing is utilised in the evaluation of acromegaly, not growth hormone deficiency.

D | Serum prolactin

possible that he has growth hormone (GH) deficiency. Clinical features of growth hormone deficiency include impaired well-being, reduced energy and vitality, reduced muscle mass and exercise tolerance, decreased sweating, increased cardiovascular risk and increased fracture risk (osteoporosis). A serum IGF-1 concentration lower than the lower limit of normal in a patient who has pituitary disease confirms the diagnosis of GH deficiency. Even a normal value does not exclude GH deficiency; further investigations would be indicated here.

B Insulin tolerance test

Insulin tolerance testing to induce hypoglycaemia is a potential option for investigation, although this is unpleasant for the patient. Other options, such as the arginine-growth hormone-releasing hormone test, are preferred where these are available now.

A Magnetic resonance imaging (MRI) of the pituitary fossa

We know that pituitary anatomy is likely to be abnormal in relation to previous surgery, and further imaging won't inform as to abnormalities of gland function.

C Glucose tolerance test

Oral glucose tolerance testing is utilised in the evaluation of acromegaly, not growth hormone deficiency.

D Serum prolactin

An elevated serum prolactin would neither confirm or refute growth hormone deficiency, and this is not therefore a preferred next investigation.

Question 16 of 51

A 31-year-old woman is admitted via paramedic ambulance from the local airport, having returned on a flight from Australia. She was unable to mobilise off the flight due to pain and swelling affecting her left lower limb, and also appeared to be suffering from right sided face and arm weakness. She is usually well with no past medical history of note, and is a non-smoker.

On examination, her BP is 152/90 mmHg, pulse is 80/min and regular. There are no murmurs. Her chest is clear. You note a swollen left calf, with swelling spreading up towards the knee, consistent with a DVT. She also has a right-sided face and arm weakness consistent with a stroke.

Investigations:

Hb	125 g/l
WCC	6.5 × 10^9/l
PLT	189 × 10^9/l
NA	138 mmol/l
K	4.5 mmol/l
Creatinine	90 µmol/l
CXR	unremarkable
Left lower limb venous Doppler	extensive DVT

Which of the following is the most useful investigation to find the cause of the stroke?

A	Carotid duplex
B	Contrast echocardiography
C	CT Head

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B	Contrast echocardiography
C	CT Head
D	Thrombophilia screen
E	Transcranial Doppler ultrasound

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K	4.5 mmol/l
Creatinine	90 µmol/l
CXR	unremarkable
Left lower limb venous Doppler	extensive DVT

Which of the following is the most useful investigation to find the cause of the stroke?

Your answer was correct

A	Carotid duplex
B	Contrast echocardiography
C	CT Head
D	Thrombophilia screen
E	Transcranial Doppler ultrasound

Explanation

B Contrast echocardiography

A contrast trans-oesophageal echocardiogram using agitated saline is the optimal to visualise a patent foramen ovale (PFO), the most likely cause of this patient's stroke. It is possible that part of the deep vein thrombosis has traversed the PFO and moved from the right to the left side of the circulation, causing the stroke. If this is the case

B Contrast echocardiography

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A Carotid duplex

We are not given any history of cardiovascular risk factors which would point us towards significant carotid disease. Carotid duplex is most useful where there is other evidence of atherosclerosis or risk factors for its development.

C CT Head

Although CT head is useful as part of the stroke workup, it will not tell us the likely underlying cause.

D Thrombophilia screen

Although thrombophilia screen may provide information about increased risk of thromboembolic disease, it will not provide the link between the DVT and the cerebral event.

E Transcranial Doppler ultrasound

Although transcranial Doppler is useful in establishing the presence of a shunt, it cannot in this case provide information on the location of the shunt.

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E	Transcranial Doppler ultrasound

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A 71-year-old man is referred to the Rheumatology Clinic with pain over his left hip and pelvis. Previously very active, he is now limited to walking only a few hundred yards due to pain. Past medical history of note includes hypertension, which is treated with felodipine.

On examination, his BP is 135/70 mmHg, with pulse 70/min and regular. He has pain over the left hip, and flexion and external rotation are limited by pain. His GP has arranged an X-ray of the hip, which reveals evidence of osteolysis and new bone formation around both the femoral head and the pelvis.

Which of the following is most likely to be abnormal?

A	Calcium
B	Alkaline phosphatase
C	Vitamin D
D	Phosphate
E	Parathyroid hormone (PTH)

36467

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Your answer was correct

A	Calcium
B	Alkaline phosphatase
C	Vitamin D
D	Phosphate
E	Parathyroid hormone (PTH)

Explanation

B Alkaline phosphatase

The X-ray appearance is typical of Paget's disease. In patients with Paget's, other markers of bone turnover, apart from alkaline phosphatase, are usually in the normal range. Alkaline phosphatase is a useful marker of disease activity and of response to bisphosphonates, with a fall in alkaline phosphatase correlating with a reduction in disease activity. Over the longer term, bisphosphonates may not be completely effective; one study suggested that despite the use of etidronate, disease progression occurred in 28% of individuals.

A Calcium

Calcium in patients with Paget's remains in the normal range for the majority of patients, unless there is a prolonged period of bed rest, where minor elevations may be seen.

C Vitamin D

Vitamin D elevation is seen in patients with sarcoidosis and symptomatic hypercalcaemia, and in those who take excess exogenous vitamin D.

D Phosphate

Elevations in phosphate are seen in hypoparathyroidism and in those with renal impairment, rather than those with Paget's.

E Parathyroid hormone (PTH)

Hyperparathyroidism is not usually associated with single joint destruction, and is normal in patients with Paget's disease.

You review a 36-year-old woman who presents to the Emergency Department with anxiety and palpitations. She has an 8-month-old child. Over the past 4 months, she has lost 5 kg in weight but puts this down to all the work looking after her baby.

The admitting nurses notice that she has rather 'staring eyes' and on examination you notice she has obvious chemosis, proptosis and lid lag. Thyroid-stimulating hormone (TSH) measurement is 0.05 mU/l.

Which of the following best fits the underlying diagnosis of her systemic condition?

A Graves' disease

B Hashimoto's thyroiditis

C Riedel's thyroiditis

D Toxic thyroid adenoma

E Postpartum thyroiditis

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Your answer was correct

A Graves' disease
B Hashimoto's thyroiditis
C Riedel's thyroiditis
D Toxic thyroid adenoma
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Explanation

A Graves' disease

This woman has Graves' ophthalmopathy and thyrotoxicosis. Graves' ophthalmopathy occurs due to local accumulation of glycosaminoglycans; 75% of Graves'

Question 18 of 51

A Graves' disease

This woman has Graves' ophthalmopathy and thyrotoxicosis. Graves' ophthalmopathy occurs due to local accumulation of glycosaminoglycans; 75% of Graves' patients develop the disease within 1 year of ophthalmopathy occurring. The condition can be worsened by smoking and by hypothyroidism post-radioiodine treatment. If visual impairment, with blurring or visual field loss, or pain occurs, then this is a sign of optic neuropathy, and the patient should be referred to an ophthalmologist for treatment. Standard therapy involves a portfolio of treatment modalities that may include systemic corticosteroids, radiotherapy or orbital decompression, or a combination of treatments. In patients with thyroid eye disease undergoing radioiodine treatment, post-radioiodine hypothyroidism should be avoided because of the risk of worsening Graves' eye disease. For this reason, patients are stabilised on a block-replace regimen before moving to radioiodine therapy.

B Hashimoto's thyroiditis

Hashimoto's disease is associated with goitre, but not with thyroid eye disease, and leads to hypothyroidism not thyrotoxicosis.

C Riedel's thyroiditis

This leads to fibrotic disease of the thyroid gland and to hypothyroidism rather than thyrotoxicosis.

D Toxic thyroid adenoma

Toxic thyroid adenoma is associated with thyrotoxicosis, but not with the eye signs seen here which are related to

A 25-year-old woman presents with palpitations which have worsened in frequency over the past week, a blood pressure of 130/80 mmHg and she is found to have atrial fibrillation on her ECG.

On examination, she has a palpable, smooth thyroid goitre. She is 3 months' postpartum and is currently breast-feeding. Her daughter is very healthy. She has no past medical history. TSH is supressed at < 0.05 mU/l and is TSH receptor and TPO antibody positive.

Which one of the following is the most likely diagnosis of her goitre?

A	Postpartum thyroiditis
B	Pregnancy
C	Graves' disease
D	Struma ovarii
E	Subacute thyroiditis

32915

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Your answer was correct

A	Postpartum thyroiditis
B	Pregnancy
C	Graves' disease
D	Struma ovarii
E	Subacute thyroiditis

Explanation

A	Postpartum thyroiditis

This patient has clinical hyperthyroidism and is in the first few months after pregnancy. As such, the most likely [illegible]roiditis. In women who present

Question 19 of 51

A Postpartum thyroiditis

This patient has clinical hyperthyroidism and is in the first few months after pregnancy. As such, the most likely diagnosis is postpartum thyroiditis. In women who present with postpartum thyroiditis and have symptoms of thyrotoxicosis, TSH receptor antibodies are found with increased frequency, although TPO antibodies are classically described in association with the condition. A transient period of hypothyroidism follows the episode of thyrotoxicosis, and up to 30% of patients may eventually develop permanent hypothyroidism.

B Pregnancy

Pregnancy may be associated with development of a goitre, but thyrotoxicosis is of course pathological.

C Graves' disease

Postpartum thyroiditis may be a harbinger of permanent thyroid dysfunction in some women, but the timing here points us towards postpartum disease rather than diagnosing Graves' at this stage.

D Struma ovarii

Struma ovarii is caused by ectopic thyroid tissue, so there is no goitre present.

E Subacute thyroiditis

Subacute thyroiditis is associated with symptoms of a flu-like illness, pain over the thyroid gland and thyrotoxicosis. It is not associated with pregnancy.

A 52-year-old man on a visit to his GP has been noticed to have a blood pressure of 160/90 mm Hg. He has a 7-year history of type 2 diabetes, which is currently managed with metformin 1 g twice daily and gliclazide 160 mg twice daily. His BMI in the clinic was 26.

Systemic examination otherwise was normal apart from bilateral peripheral sensory loss and loss of vibration sense up to his knees, consistent with diabetic neuropathy. He has also had laser photocoagulation treatment in both eyes. Other medication of note includes ramipril 10 mg daily, atorvastatin and aspirin, which were started approximately 5 years earlier.

Investigations:

HbA1c	70.49 mmol/mol (8.6%) g/dl
Urea	16.7 mmol/l
Phosphate	1.02 mmol/l
Na^+	138 mmol/l
K^+	4.8 mmol/l
Creatinine	225 µmol/l
Ca^{2+}	2.27 mmol/l
Albumin	38 g/l
Chloride	115 mmol/l
Bicarbonate	18 mmol/l
Urine protein	0.8 g/24 h
Urine albumin/creatinine ratio	25 mg/mmol (normal range <3 mg/mmol)
ECG	Normal

Which next step in his management would be the most

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Urine protein	0.8 g/24 h
Urine albumin/creatinine ratio	25 mg/mmol (normal range <3 mg/mmol)
ECG	Normal

Which next step in his management would be the most appropriate?

A	Stop gliclazide and metformin and start a basal bolus insulin regime
B	Reduce the dose of ACE inhibitor by 50%
C	Stop his ACE inhibitor
D	Start beta-blockers
E	Start furosemide

Explanation

A Stop gliclazide and metformin and start a basal bolus insulin regime

This gentleman's renal function precludes the use of metformin. Moreover, the fact that despite being on the maximum dose of gliclazide and a high dose of metformin, his suboptimal HbA1c points towards the need for insulin initiation. A basal bolus regimen would be ideal given his poor renal function. Moreover, it will provide flexibility in terms of dose adjustment and will optimize his glycaemic control. Tight glycaemic control is crucial given that this gentleman has already diabetic nephropathy, retinopathy and peripheral neuropathy.

B Reduce the dose of ACE inhibitor by 50%

The target blood pressure for diabetics is recommended as <140/80 mmHg, or 125/75 mmHg in type 1 diabetic patients and individuals who have at least micro-albuminuria. ACE inhibitors are renoprotective in patients with a history of diabetic nephropathy, and thus continuing the ACE inhibitor at maximal tolerated dose is recommended. They also have significant effect on reducing the albuminuria.

C Stop his ACE inhibitor

It is likely that the creatinine seen here is chronically elevated in the context of diabetic nephropathy and has not been worsened by ACE inhibition.

D Start beta-blockers

This patient needs better management of his hypertension, and the use of a second agent would be necessary. Beta-blockers would not be a first choice unless there is history

recommended. They also have significant effect on reducing the albuminuria.

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It is likely that the creatinine seen here is chronically elevated in the context of diabetic nephropathy and has not been worsened by ACE inhibition.

D Start beta-blockers

This patient needs better management of his hypertension, and the use of a second agent would be necessary. Beta-blockers would not be a first choice unless there is history of atrial fibrillation or coronary artery disease, given the potential worsening effect of some of these on glycaemic control.

E Start furosemide

There is no evidence of fluid overload that could justify its use, and it could potentially worsen the renal function.

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A 56-year-old woman was admitted to the Intensive Therapy Unit (ITU) after a road traffic accident. There were multiple long bone fractures and significant bleeding, and she required a period of mechanical ventilation due to a chest injury.

Past medical history of note includes hypertension, which is managed with indapamide, and obesity with a BMI of 31. During her recovery, the orthopaedic surgeons noticed a small goitre.

Results obtained 6 days after admission:

Free thyroxine (T4)	4.1 pmol/l (10-22)
Free tri-iodothyronine (T3)	1.5 pmol/l (5-10)
Thyroid-stimulating hormone (TSH)	0.5 mU/l (0.4-5)
Random cortisol	1250nmol/l (200-700 at 0900 h)

Which of the following is the most appropriate management of her thyroid disorder?

A	Thyroxine 50 mcg/day
B	Thyroxine 100 mcg/day
C	Carbimazole
D	Propylthiouracil
E	Repeat thyroid function testing in 3 months

E Repeat thyroid function testing in 3 months

This patient has a normal thyroid-stimulating hormone (TSH) level, which suggests that she is suffering from 'sick euthyroid' syndrome. This condition, characterised by low tri-iodothyronine (T3) and thyroxine (T4) and normal TSH, is associated with severe illness and frequently occurs in patients admitted to the ITU. Most physicians advise repeating thyroid function testing in a few months; there is no evidence that patients benefit from thyroid hormone replacement. This patient's level of cortisol is entirely appropriate given her admission to the ITU and road traffic accident. While she is obese, the possibility of co-existent Cushing's disease is unlikely. It might be appropriate to repeat a morning cortisol level a few more weeks into her recovery.

A Thyroxine 50 mcg/day

Resolution of the underlying illness (in this case the trauma and subsequent surgery) is enough to correct thyroid function. Replacing thyroid hormone, even at low dose, risks driving symptoms of thyrotoxicosis and potentially hindering recovery.

B Thyroxine 100 mcg/day

Thyroxine 100 mcg/day will drive suppression of TSH and symptoms of hyperthyroidism. Resolution of thyroid dysfunction, accompanied by restoration of T3 and T4 levels, occurs within a few weeks.

C Carbimazole

Thyroid hormone levels are depressed as a result of the acute illness, and thus there is no value in suppressing thyroid hormone production further.

A 24-year-old man with a history of previous injury in a motorcycle accident comes to the clinic with his mother. She looks after him as he has been left with a right arm and leg weakness after a skull fracture and intracranial haemorrhage. He also has epilepsy for which he takes carbamazepine. They complain that he is thirsty all the time and can't stop drinking litres of water and squash each day. His mother herself has significant chronic illness, suffering from chronic left ventricular failure.

Investigations:

Hb	13.4 g/dl
WCC	5.9 $\times 10^9$/l
PLT	203 $\times 10^9$/l
Na^+	149 mmol/l
K^+	4.5 mmol/l
Creatinine	143 μmol/l
Bicarbonate	22 mmol/l
Plasma osmolality	350 mosmol/kg
Urine osmolality	270 after water deprivation, rises to 810 after DDAVP

Which of the following is the most likely diagnosis?

A	Nephrogenic diabetes insipidus
B	SIADH
C	Cranial diabetes insipidus
D	Psychogenic polydipsia

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B	SIADH
C	Cranial diabetes insipidus
D	Psychogenic polydipsia
E	Diuretic abuse

Explanation

C **Cranial diabetes insipidus**

It is highly likely that this man's head injury has led to cranial diabetes insipidus. Whilst it is possible given the clinical history that he may have psychogenic polydipsia, the osmolality results only fit with cranial DI as the diagnosis. Treatment is with intranasal vasopressin; given the possibility of overdose and consequent hyponatraemia, monitoring of U&E is recommended. Carbamazepine may exacerbate hyponatraemia with vasopressin therapy, and therefore close monitoring of U&E and symptom response versus vasopressin dose is even more essential in this case.

A Nephrogenic diabetes insipidus

Nephrogenic DI would not show a positive response to DDAVP and is therefore excluded here.

B SIADH

SIADH is associated with relative salt and water overload, accompanied by hyponatraemia rather than the elevated sodium seen here.

D Psychogenic polydipsia

This is the alternative diagnosis, although the history of head injury and strong response to DDAVP makes cranial diabetes insipidus much more likely.

E Diuretic abuse

Diuretic abuse may be associated with symptoms of dehydration, but elevated bicarbonate would be expected

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E	Diuretic abuse

Diuretic abuse may be associated with symptoms of dehydration, but elevated bicarbonate would be expected here.

21489

Rate this question:

A 40-year-old South African man presents to the Accident and Emergency Department. He is confused, but you can get a history from his wife. He is on holiday in the UK for a week.

He is normally in good health and was well when he arrived in the UK. The only past history of note is an admission some 3 years earlier with acute lower abdominal pain and agitation. He is on no regular medications but took some over-the-counter antihistamines yesterday for hay fever. Since then, he has been complaining of a weak arm, vomiting and abdominal pain. When he became confused, his wife became concerned and brought him to Accident and Emergency.

On examination, he is confused and hallucinating. He has bilateral wrist drop. Otherwise, examination of his peripheral nervous system and cranial nerves is normal. Pulse is 120/min and regular, and his BP is 175/100 mmHg. Examination of his chest is also normal. Examination of his abdomen reveals diffuse tenderness.

Investigations:

Na^+	120 mmol/l
K^+	4.3 mmol/l
Urea	6.0 mmol/l
Creatinine	120 µmol/l

He is given a bolus of IV glucose, what other measure would you take next?

A IV haem arginate

B Alcohol withdrawal regime of chlordiazepoxide

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He is given a bolus of IV glucose, what other measure would you take next?

A IV haem arginate

B Alcohol withdrawal regime of chlordiazepoxide

C Intravenous thiamine

D IV cyclizine

E Abdominal CT

A	IV haem arginate

This describes an attack of acute intermittent porphyria. The diagnosis requires demonstration of increased urinary excretion of the haem precursor, porphobilinogen (PBG), in the urine. All attacks of porphyria increase the activity of hepatic 5-aminolevulinate (ALA) synthase. The relation between these biochemical abnormalities and the neuronal dysfunction that underlies all the features of an acute attack is uncertain. Two procedures have been shown to decrease the activity of ALA synthase in animals - carbohydrate loading and parenteral infusion of haem arginate. Consequently, these two procedures are the mainstay of the treatment along with opiate analgesia. Provoking medication, such as the antihistamines in this case, should be withdrawn.

B	Alcohol withdrawal regime of chlordiazepoxide

Chlordiazepoxide is a benzodiazepine type sedative, but it won't manage the underlying cause of this patient's agitation, an acute episode of porphyria.

C	Intravenous thiamine

We aren't given a significant alcohol consumption history as part of the scenario, and the previous episode 3 years ago of abdominal pain fits with intermittent porphyria, and thus thiamine is not likely to be effective here.

D	IV cyclizine

Cyclizine is an anti-emetic with some antihistamine activity; reports about its safety conflict with respect to use in porphyria, with some case reports suggesting it can be used and others raising the possibility that it can precipitate porphyria episodes.

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E	Abdominal CT

The symptoms of pseudo-obstruction with hypertension and hyponatraemia are most consistent with acute intermittent porphyria; the abdominal CT is therefore most likely to be normal.

Question 24 of 51

An 18-year-old woman from a travelling family presents for review. Her mother is concerned as her periods have not started.

On examination, she is significantly shorter than would be expected given her parental height, her nipples are widely spaced and there is a suspicion of a high-arched palate. There appears to be failure of secondary sexual characteristics. Her blood pressure is elevated at 149/90 mmHg.

Investigations reveal an FSH > 40 IU/l on at least two occasions.

Which of the following is the most appropriate investigation in this case?

A Karyotyping

B Autoimmune screen

C Pituitary MRI

D Abdominal ultrasound scan

E Oestrogen levels

32899

A Karyotyping

The most appropriate investigation is karyotyping. There is a strong suspicion that this patient has Turner syndrome and that access to health services has been patchy because she is from a travelling family. Features include short stature, webbing of the neck, micrognathia, low-set ears, a high-arched palate, widely spaced nipples and cubitus valgus, some of which are clearly present here. Turner occurs due to the complete or partial absence of one X chromosome and diagnosis is by lymphocyte karyotyping. Turner is associated with a number of other associated abnormalities including aortic coarctation and other left-sided congenital heart defects, osteoporosis, hypothyroidism, lymphoedema, skeletal abnormalities and congenital malformations of the renal tract. Surveillance echocardiography and renal ultrasound are recommended.

B Autoimmune screen

Autoimmune screening is a potential investigation in primary ovarian failure, which may be associated with other autoimmune diseases.

C Pituitary MRI

Pituitary MRI is most useful in secondary ovarian failure associated with elevated prolactin in an attempt to identify the presence of a pituitary adenoma.

D Abdominal ultrasound scan

Although an ultrasound scan may identify the absence of normal ovaries, karyotyping is straightforward and a sample can be taken at the initial outpatient appointment. Given she is from a travelling family, there is potential she may only have patchy attendance for further follow-up.

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E Oestrogen levels

Oestrogen levels will be low, but measuring them won't determine the underlying pathophysiology.

Question 25 of 51

A 54-year-old housewife is referred to your clinic with a history of 'funny turns' over the last 2 years. She complains of intermittent episodes of feeling sweaty and faint and having double vision. She tells you that she often feels better after a strong cup of tea with three sugars. She has no medical history of note and is taking no tablets. Her mother had diabetes mellitus and her father had epilepsy. She smokes 10 cigarettes a day and drinks alcohol occasionally. Her examination is completely normal.

Investigations:

Urea	6.8 mmol/l
Ca^{2+}	2.93 mmol/l
PO_4	0.84 mmol/l
Na^+	136 mmol/l
K^+	5.4 mmol/l
Creatinine	84µmol/l
Glucose	5.3 mmol/l

What is the most likely diagnosis?

A Petit mal epilepsy

B Recurrent TIAs

C Multiple endocrine neoplasia type-1

D Paroxysmal atrial fibrillation

E Phaeochromocytoma

E Phaeochromocytoma

Explanation

C Multiple endocrine neoplasia type-1

An insulinoma should be suspected in this patient, given her 2-year history of 'funny turns' and the fact that she feels better after a strong cup of tea. Furthermore the blood tests reveal an elevated calcium, raising the suspicion of associated hyperparathyroidism. Multiple endocrine neoplasia (MEN)-1 should be suspected here, which may be a combination of a pituitary tumour (often a macroadenoma), hyperparathyroidism and a pancreatic islet tumour. Of course all these conditions may not necessarily occur at the same point in time.

The *MEN 1* gene has an autosomal-dominant pattern of inheritance. Any individual with a relative with *MEN 1* should be screened. Mutational analysis of the coding region has a sensitivity of about 95% in *MEN 1* patients. Relatives without the mutation can be reassured and do not require regular screening. Screening includes serum calcium and prolactin in all patients; 90% of *MEN 1* patients present with hypercalcaemia.

A Petit mal epilepsy

This is a common type of epilepsy syndrome presenting in children in the first decade. A seizure is characterised by a brief staring episode with behavioural arrest. A 3 Hz spike-and-slow-wave discharge on electroencephalogram (EEG is generally associated with this seizure.

B Recurrent TIAs

Transient ischemic attack (TIA) is defined as a transient episode of neurologic dysfunction caused by focal brain,

A 54-year-old housewife is referred to your clinic with a history of 'funny turns' over the last 2 years. She complains of intermittent episodes of feeling sweaty and faint and having double vision. She tells you that she often feels better after a strong cup of tea with three sugars. She has no medical history of note and is taking no tablets. Her mother had diabetes mellitus and her father had epilepsy. She smokes 10 cigarettes a day and drinks alcohol occasionally. Her examination is completely normal.

Investigations:

Urea	6.8 mmol/l
Ca^{2+}	2.93 mmol/l
PO_4	0.84 mmol/l
Na^+	136 mmol/l
K^+	5.4 mmol/l
Creatinine	84µmol/l
Glucose	5.3 mmol/l

What is the most likely diagnosis?

Your answer was correct

A Petit mal epilepsy

B Recurrent TIAs

eoplasia type-1

is generally associated with this seizure.

B Recurrent TIAs

Transient ischemic attack (TIA) is defined as a transient episode of neurologic dysfunction caused by focal brain, spinal cord or retinal ischaemia, without acute infarction. The duration of symptom/sign is <24 h and resolution is not related to consumption of any food/beverage.

D Paroxysmal atrial fibrillation

Paroxysmal AF (PAF) is defined as an episode of AF that reverts to sinus rhythm spontaneously or with intervention within seven days. Symptoms can be irregular palpitations, shortness of breath, dyspnoea on exertion, a sensation of light-headedness or less commonly fatigue, weakness or generalised malaise. In acute presentations, heart rate is controlled by a beta blocker or calcium channel blocker. If spontaneous reversion doesn't occur and there is haemodynamic compromise, electrical cardioversion is considered or, alternatively, pharmacological conversion with flecainide or amiodarone.

E Phaeochromocytoma

Phaechromocytoma are rare catecholamine-secreting tumours occurring in <0.2% of patients with hypertension. Most (about 70%) are sporadic. Classical symptoms are headaches, sweating and tachycardia. Other symptoms include palpitations, tremor, pallor, dyspnoea, generalised weakness, and panic attack-type symptoms. Most common sign is sustained or paroxysmal hypertension. Symptoms usually resolve spontaneously without intervention.

A 37-year-old woman has been brought to the Emergency Department with a 1-day history of abdominal pain, diarrhoea and vomiting. She has a history of type 1 diabetes mellitus and pernicious anaemia.

Her partner tells you that her general practitioner (GP) has recently prescribed amoxicillin for her chest infection and that she has lost 12.5 kg (nearly 2 stone) in weight over the last few months. She does not smoke or drink alcohol.

On examination, she is flushed, disorientated, agitated and jaundiced. Her temperature is 42.1 °C, pulse 180 bpm and irregular and blood pressure (BP) 180/70 mmHg. You detect a third heart sound, her chest is clear and her abdomen generally tender. Her legs are weak proximally and all reflexes brisk. She has some pitting oedema of her lower limbs.

Investigations:

Hb	10.3 g/dl
WCC	17.2 × 10^9/l
PLT	9.0 /l
Na^+	131 mmol/l
K^+	2.8 mmol/l
Creatinine	165 µmol/l
Ca^{2+}	2.82 mmol/l
Bilirubin	64 µmol/l
ALT	140 U/l
ALP	210 U/l
Glucose	19.8 mmol/l
Neutrophils	12.6 × 10^9/l
MCV	102.4 fl

11:50

Pastest+

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Hb	10.3 g/dl
WCC	17.2×10^9/l
PLT	9.0 /l
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ALP	210 U/l
Glucose	19.8 mmol/l
Neutrophils	12.6×10^9/l
MCV	102.4 fl

Results of an ECG show a fast AF.

What is the most likely diagnosis?

A Atypical pneumonia

B Diabetic ketoacidosis

C Thyroid storm

D Gastroenteritis

E Adverse drug reaction

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C Thyroid storm

Her past history of diabetes mellitus and pernicious anaemia makes it more likely that she has a further autoimmune disorder. The history of weight loss suggests an underlying thyroid disorder, with the thyroid storm being precipitated by her chest infection. Thyroid storm is a sudden, life-threatening exacerbation of thyrotoxicosis. Some series suggest a mortality rate of between 30 and 75%. Its manifestations are due to the action of excess thyroid hormone. Fever is the most characteristic feature, with the temperature often rising above 41°C. There may be evidence of organ damage. The clinical picture is frequently clouded by a secondary infection such as pneumonia or a viral infection. Death may be caused by cardiac arrhythmia, congestive heart failure, hyperthermia or other unidentified factors. The diagnosis of thyroid storm is made entirely on clinical grounds. The results of thyroid function tests will rarely be available soon enough to make the diagnosis. Propylthiouracil followed by a stable iodine preparation (e.g. Lugol's iodine) is usually given. Propranolol, intravenous fluids, dexamethasone and cooling are also often required. Finally, one must remember to treat the precipitating cause.

A Atypical pneumonia

This is caused by 'atypical' pathogens such as *M. pneumoniae*, *Legionella* spp, C. *pneumonia* and *C. psittaci*. Absence of cough and respiratory signs on physical examination makes this diagnosis unlikely. Incubation period is usually within 10 days, and onset of illness to presentation time is usually within a week.

B Diabetic ketoacidosis

Diabetic ketoacidosis usually evolves within 24 h. It is characterised by the triad of metabolic acidosis (7.25 or

A 38-year-old man with a history of hypertension is referred to the endocrine clinic. The GP has not yet commenced anti-hypertensive therapy, but is worried as three measured BPs over the past 2 months have been >150 mmHg systolic. On examination he looks well and his BP is 157/92 mmHg. His BMI is 29.

Investigations:

Hb	12.1 g/dl	
WCC	4.1 × 10^9/l	
PLT	190 × 10^9/l	
Na^+	139 mmol/l	
K^+	3.9 mmol/l	
Creatinine	110 µmol/l	
Fasting glucose	5.2 nmol/l	
Urinary free cortisol	320 nmol/24 h (normal <280)	
Renin	Supine: 3.0 pmol/ml/h (normal 1.1-2.7)	Upright: 5.0 pmol/ml/h (normal 3.0-4.3) after 30 min
Aldosterone	Supine: 600 pmol/ml (normal 135-400) after 30 min	Upright: 1200 pmol/ml (normal 330-830) after 4 h

Which of the following is the most likely diagnosis?

A	Primary hyperaldosteronism

WCC	4.1 × 10^9/l	
PLT	190 × 10^9/l	
Na^+	139 mmol/l	
K^+	3.9 mmol/l	
Creatinine	110 μmol/l	
Fasting glucose	5.2 nmol/l	
Urinary free cortisol	320 nmol/24 h (normal <280)	
Renin	Supine: 3.0 pmol/ml/h (normal 1.1-2.7)	Upright: 5.0 pmol/ml/h (normal 3.0-4.3) after 30 min
Aldosterone	Supine: 600 pmol/ml (normal 135-400) after 30 min	Upright: 1200 pmol/ml (normal 330-830) after 4 h

Which of the following is the most likely diagnosis?

A	Primary hyperaldosteronism
B	Cushing syndrome
C	Phaeochromocytoma
D	Renal artery stenosis
E	Coarctation of the aorta

D Renal artery stenosis

Both this patient's renin and aldosterone levels are raised, which rules out primary hyperaldosteronism. The fact that this is secondary hyperaldosteronism raises the possibility of intrinsic renal disease, which given the options makes renal artery stenosis the most likely cause. The next diagnostic steps would be to consider a renal ultrasound scan and magnetic resonance angiogram.

A Primary hyperaldosteronism

This is effectively ruled out because of the elevation in renin levels seen here.

B Cushing syndrome

The urinary free cortisol is only slightly above the upper limit of normal and is therefore very unlikely to account for the hypertension seen here.

C Phaeochromocytoma

The raised renin and aldosterone levels are a pointer towards renal artery stenosis, and the hypertension seen with phaeochromocytoma is often episodic in nature.

E Coarctation of the aorta

Symptomatic coarctation of the aorta without other presenting features, such as shortness of breath on exercise, differential blood pressure in both arms and radio-femoral delay, is an unlikely alternative diagnosis.

A 36-year-old man is admitted via the Emergency Department, having suffered a very severe headache after chasing a man who was stealing his car.

Previously fit and well and of normal stature, he was noted to be hypertensive on admission with a blood pressure (BP) of 165/90 mmHg, which later settled to 155/85 mmHg.

On further questioning, it was noted that his mother was known to have had 'thyroid cancer', and died at an early age.

What is the most likely unifying diagnosis behind his presentation?

A Multiple endocrine neoplasia type 1 (MEN-1)

B MEN-2b

C MEN-2a

D Familial medullary thyroid carcinoma syndrome

E Von Hippel–Lindau disease

Department, having suffered a very severe headache after chasing a man who was stealing his car.

Previously fit and well and of normal stature, he was noted to be hypertensive on admission with a blood pressure (BP) of 165/90 mmHg, which later settled to 155/85 mmHg.

On further questioning, it was noted that his mother was known to have had 'thyroid cancer', and died at an early age.

What is the most likely unifying diagnosis behind his presentation?

Your answer was correct

A Multiple endocrine neoplasia type 1 (MEN-1)

B MEN-2b

C MEN-2a

D Familial medullary thyroid carcinoma syndrome

E Von Hippel–Lindau disease

Explanation

C MEN-2a

The history of marked hypertension in this gentleman, coupled with a family history of thyroid carcinoma, should raise the possibility of multiple endocrine neoplasia (MEN). MEN-2a is characterised by medullary thyroid carcinoma, phaeochromocytoma and parathyroid chief cell hyperplasia. It is likely that both this man and his mother carry the same mutation. Around 30% of carriers of an

C MEN-2a

The history of marked hypertension in this gentleman, coupled with a family history of thyroid carcinoma, should raise the possibility of multiple endocrine neoplasia (MEN). MEN-2a is characterised by medullary thyroid carcinoma, phaeochromocytoma and parathyroid chief cell hyperplasia. It is likely that both this man and his mother carry the same mutation. Around 30% of carriers of an MEN-2a mutation never develop the associated clinical syndrome.

The initial diagnostic investigation of choice for phaeochromocytoma is 24 h urinary catecholamine assay. Where the diagnosis is proven, it is sensible to screen for medullary thyroid carcinoma via pentagastrin testing. Conversely, where patients present with medullary thyroid carcinoma, they should be screened for phaeochromocytoma prior to consideration of surgery. Where adequate alpha blockade is not in place prior to surgery, there is a very real chance of hypertensive crisis and possible on-table myocardial infarction.

A Multiple endocrine neoplasia type 1 (MEN-1)

MEN-1 is associated with multiple parathyroid adenomas, pancreatic islet cell tumours and pituitary adenomas (prolactinomas being most commonly seen).

B MEN-2b

MEN-2b tends to occur as a sporadic mutation; additional features compared to MEN-2a include a marfanoid habitus and multiple mucosal neuromas.

D Familial medullary thyroid carcinoma syndrome

Familial medullary thyroid carcinoma syndrome is associated with the RET mutation, although presentation

MEN-1 is associated with multiple parathyroid adenomas, pancreatic islet cell tumours and pituitary adenomas (prolactinomas being most commonly seen).

B	MEN-2b

MEN-2b tends to occur as a sporadic mutation; additional features compared to MEN-2a include a marfanoid habitus and multiple mucosal neuromas.

D	Familial medullary thyroid carcinoma syndrome

Familial medullary thyroid carcinoma syndrome is associated with the RET mutation, although presentation with phaeochromocytoma would not be expected.

E	Von Hippel-Lindau disease

VHL is associated with phaeochromocytoma, although it often presents earlier with balance disturbance due to the presence of CNS haemangioblastomas.

A 32-year-old bank clerk was admitted via A&E with a 2-day history of severe abdominal pain, nausea and vomiting. He had returned from a week's holiday in Crete 2 weeks ago. He says he is worried because he had numerous episodes of unprotected heterosexual intercourse. He is feeling weak, has lost his appetite and has lost 6.3 kg (1 stone) in weight. He smokes 20 cigarettes a day and often drinks a bottle of red wine for dinner. His mother has type 1 diabetes mellitus and his father has had a stroke. On examination his clothes hang loosely and he has a suntan. He is afebrile. His pulse is 60 bpm and his BP 80/40 mmHg. His heart sounds are normal and his chest is clear. His abdomen is soft but tender on palpation. Bowel sounds are present. His neurological examination is normal, as is a CXR.

Investigations:

Hb	11.0 g/dl
WCC	3.2 × 10^9/l
PLT	143 × 10^9/l
Na^+	121 mmol/l
K^+	5.0 mmol/l
Creatinine	65 µmol/l
Ca++	2.72 mmol/l
Urea	7.2 mmol/l
Albumin	34 g/l
Glucose	9.8 mmol/l
MCV	101.3 fl
Blood film	Macrocytosis

What is the most likely diagnosis?

present. His neurological examination is normal, as is a CXR.

Investigations:

Hb	11.0 g/dl
WCC	3.2 × 10^9/l
PLT	143 × 10^9/l
Na^+	121 mmol/l
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Albumin	34 g/l
Glucose	9.8 mmol/l
MCV	101.3 fl
Blood film	Macrocytosis

What is the most likely diagnosis?

A	Gonococcal sepsis
B	IV drug abuse
C	Addison's disease
D	Gastroenteritis
E	Diabetic ketoacidosis

C Addison's disease

Over 90% of patients diagnosed complain of weakness, hyperpigmentation, anorexia, nausea, vomiting and hypotension. In addition, the accompanying macrocytic anaemia suggests a diagnosis of pernicious anaemia. Between 70 and 90% of cases of Addison's disease in the UK are caused by autoimmune adrenalitis. The combination of a high ACTH concentration (>80 ng/l) and a poorly responsive Synacthen test is diagnostic of Addison's disease. The raised glucose raises the possibility of co-existent autoimmune diabetes, but the glucose isn't high enough to indicate ketoacidosis.

A Gonococcal sepsis

Gonococcal sepsis affects 0.5–3% patients with a sexually transmitted Gram-negative organism called *N. gonorrhoeae*. It presents as one of the two common syndromes: a triad of tenosynovitis, dermatitis and polyarthralgia without purulent arthritis (also called the 'arthritis-dermatitis syndrome'); or purulent arthritis without associated skin lesions.

B IV drug abuse

There would be signs of injection drug use, including scars at injection sites (so-called 'track marks') on the skin. When acutely unwell, patients can present with medical conditions affecting one or more system – the cardiovascular system (infective endocarditis, heart failure, cardiomyopathy, etc.); renal system (kidney failure); gastrointestinal system (pancreatitis, cirrhosis, chronic liver disease, infective hepatitis, etc.); central nervous system (dementia, memory impairment, cerebrovascular events, etc.); or respiratory system (lung abscess, pneumonia, chronic obstructive airway disease, TB, etc.).

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D Gastroenteritis

Diarrhoea and frequent vomiting are usually present together, but the former symptom conspicuously is absent in this case making this diagnosis less likely. Vomiting can present in isolation in some cases of viral gastroenteritis, but the incubation period is usually shorter (<72 h).Weight loss in not present in the acute phase.

E Diabetic ketoacidosis

There is no weight loss as the presentation is acute, and the patient is significantly dehydrated. Laboratory investigations to confirm the diagnosis include the following: elevated plasma glucose (>13 mmol/l), arterial pH ≤7.3, serum bicarbonate ≤15 mmol/l, positive urine ketones, blood ketones ≥3 mmol/l.

A 68-year-old woman presents with an ulcer over the left medial malleolus on her left leg. She has a history of obesity and hypertension, and has been recently diagnosed with type 2 diabetes. On examination she has obvious bilateral varicose veins; there is no evidence of diabetic neuropathy.

Investigations:

Hb	14.0 g/dl
WCC	6.1 x10⁹/l
PLT	310 x10⁹/l
Na⁺	140 mmol/l
K⁺	5.0 mmol/l
Creatinine	140 µmol/l
Glucose	8.1 mmol/l
ABPI	0.9

Which of the following options offers the best chance for complete healing of the ulcer?

A	Lower limb angioplasty
B	Multi-layer bandaging
C	Maggot therapy
D	Surgical debridement
E	Fucidin ointment

B Multi-layer bandaging

Multi-layer bandaging is most useful in reducing lower limb oedema and improving the chances of healing of venous ulcers. It is also crucial for patients to rest and keep the leg up where possible. An ankle brachial pressure index (ABPI) measurement is essential before beginning bandaging, as if there is significant arterial insufficiency, blood supply to the lower limb may be threatened. An ABPI of 0.8 has become a pivotal figure in the management of leg ulceration, defining the cut-off point for high-compression bandaging, and is frequently taken as indicating the presence of a so-called 'mixed ulcer'.

A Lower limb angioplasty

Lower limb angioplasty will improve arterial supply and has no significant impact on venous insufficiency.

C Maggot therapy

Although maggot therapy may be useful for debridement, it isn't the primary driver for healing of venous ulcers.

D Surgical debridement

Surgical debridement is only useful where there is significant necrotic tissue that risks extensive soft tissue infection.

E Fucidin ointment

Antibiotic ointment has not been shown to drive faster healing of venous ulcers.

A 31-year-old adopted man presents with acute onset central crushing chest pain. ECG confirms anterior myocardial infarction. He is a non-smoker. Cholesterol on admission was 10.5 mmol/l, with relatively normal triglycerides and a marked increase in LDL. You suspect he has familial hypercholesterolaemia. Physical findings in this man include tendon xanthomata, corneal arcus and xanthelasma.

Which of the following is the most appropriate long-term treatment for his hypercholesterolaemia?

A	Atorvastatin 10 mg OD
B	Atorvastatin 80 mg OD
C	Nicotinic acid 1.5 g OD
D	Bezafibrate 200 mg BD
E	Pravastatin 40 mg OD

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B	Atorvastatin 80 mg OD

This patient is at serious risk of further cardiovascular events and requires maximal statin therapy to reduce his LDL cholesterol. If 80 mg of atorvastatin fails to achieve the LDL target, ezetimibe can be added. Evolocumab, a PCSK9 inhibitor, is also now available for familial hypercholesterolaemia to further drive down cholesterol levels.

A	Atorvastatin 10 mg OD

This will not achieve the LDL target given the high baseline.

C	Nicotinic acid 1.5 g OD

Nicotinic acid primarily targets hypertriglyceridaemia and drives a modest rise in HDL cholesterol, rather than specifically targeting LDL. Tolerability is poor in many patients due to symptoms of itching and facial flushing.

D	Bezafibrate 200 mg BD

Fibrates remain the treatment of choice for hypertriglyceridaemia, although the FIELD outcome study did not indicate a significant impact on cardiovascular risk.

E	Pravastatin 40 mg OD

Pravastatin 40 mg has only modest effects on LDL cholesterol and is therefore unlikely to achieve target here.

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A 21-year-old student nurse presents with frequent episodes of collapse. One of these occurred during a placement in the Emergency Department at the same time as a cardiac arrest. Blood glucose at the time was noted to be 1.4 mmol/l. Other blood tests were unremarkable.

On examination straight after an event, her BP was 123/82 mmHg, withpulse is 95/min and regular and she was cold and sweaty. Blood taken at the time confirmed a venous blood glucose of 1.2 mmol/l, C-peptide level was low-normal and insulin levels were markedly elevated.

Which of the following is the most likely diagnosis in this case?

A Insulinoma
B Sulphonylurea misuse
C Insulin misuse
D Alcohol misuse
E Retroperitoneal sarcoma

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Which of the following is the most likely diagnosis in this case?

Your answer was correct

A	Insulinoma
B	Sulphonylurea misuse
C	Insulin misuse
D	Alcohol misuse
E	Retroperitoneal sarcoma

Explanation

C Insulin misuse

Hyperinsulinaemia in the presence of a normal or low C-peptide is suggestive of insulin misuse, which is unfortunately a more common occurrence in healthcare

D	Alcohol misuse
E	Retroperitoneal sarcoma

Explanation

C	Insulin misuse

Hyperinsulinaemia in the presence of a normal or low C-peptide is suggestive of insulin misuse, which is unfortunately a more common occurrence in healthcare professionals who are seeking attention, as is the case here. As here, measurement of insulin, glucose and C-peptide at the time of a collapse is crucial for making the diagnosis.

A	Insulinoma

Insulinoma is a rare occurrence, and is associated with elevated insulin and C-peptide. Overnight fasting, coupled with supervised exercise, is the most commonly used protocol to drive a hypoglycaemic episode.

B	Sulphonylurea misuse

Elevation in both C-peptide and insulin may raise suspicion of sulphonylurea abuse. It is possible to assay levels of commonly used sulphonylureas in urine, and this should be considered.

D	Alcohol misuse

Hypoglycaemia does occur in association with alcohol misuse, but this is commonly following a period of binge drinking and it's unlikely this person could work in a hospital environment whilst having consumed significant

An 18-year-old woman is admitted with diabetic ketoacidosis. She is usually managed with basal bolus insulin but has omitted a number of doses due to a row with her boyfriend. On examination her respiratory rate is 35/min, she is drowsy, confused and smells of pear drops.

Which of the following results would fit best with her arterial blood gases?

A pH 7.4; pCO_2 3.0 mmol/l; pO_2 12.1 mmol/l

B pH 7.5; pCO_2 3.0 mmol/l; pO_2 7.4 mmol/l

C pH 7.25; pCO_2 6.7 mmol/l; pO_2 7.4 mmol/l

D pH 7.1; pCO_2 3.0 mmol/l; pO_2 11.1 mmol/l

E pH 7.4; pCO_2 6.7 mmol/l; pO_2 6.7 mmol/l

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Your answer was correct

A pH 7.4; pCO_2 3.0 mmol/l; pO_2 12.1 mmol/l

B pH 7.5; pCO_2 3.0 mmol/l; pO_2 7.4 mmol/l

C pH 7.25; pCO_2 6.7 mmol/l; pO_2 7.4 mmol/l

D pH 7.1; pCO_2 3.0 mmol/l; pO_2 11.1 mmol/l

E pH 7.4; pCO_2 6.7 mmol/l; pO_2 6.7 mmol/l

Explanation

D pH 7.1; pCO_2 3.0 mmol/l; pO_2 11.1 mmol/l

The characteristic picture of metabolic acidosis with hyperventilation and the smell of pear drops is typical of diabetic ketoacidosis. Hyperglycaemia with a relatively normal pH is of course seen in patients with hyperosmolar non-ketotic coma, typically found in the elderly population with type 2 diabetes who retain enough residual insulin production to avoid becoming ketotic.

A pH 7.4; pCO_2 3.0 mmol/l; pO_2 12.1 mmol/l

Drowsiness with respiratory compensation accompanied by a pear drop smell would always imply a metabolic acidosis due to diabetic ketoacidosis until proven otherwise.

B pH 7.5; pCO_2 3.0 mmol/l; pO_2 7.4 mmol/l

This implies an alkalosis, and with a low CO_2 this would be respiratory in origin.

A	pH 7.4; pCO_2 3.0 mmol/l; pO_2 12.1 mmol/l

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B	pH 7.5; pCO_2 3.0 mmol/l; pO_2 7.4 mmol/l

This implies an alkalosis, and with a low CO_2 this would be respiratory in origin.

C	pH 7.25; pCO_2 6.7 mmol/l; pO_2 7.4 mmol/l

The pCO_2 here is elevated, which implies a respiratory rather than a metabolic acidosis.

E	pH 7.4; pCO_2 6.7 mmol/l; pO_2 6.7 mmol/l

A normal pH is inconsistent with this presentation, and the elevated pCO_2 implies a respiratory acidosis with metabolic compensation.

A 69-year-old man with long-standing type 2 diabetes managed with metformin 1 g BD, liraglutide 1.8 mg daily and glargine 30 mg nocte. He complains of burning pain affecting both feet, much worse at night. Other history of note includes problems with intermittent urinary retention. On examination his BMI is 32, and his BP is 149/82 mmHg. His feet feel warm and his peripheral pulses are easily palpable.

Investigations:

Hb	11.6 g/dl
WCC	4.5 $\times 10^9$/l
PLT	244 $\times 10^9$/l
Na^+	139 mmol/l
K^+	4.8 mmol/l
Creatinine	145 µmol/l
HbA1c	57.38 mmol/mol (7.4%)

Which of the following represents the most appropriate first line treatment in this case?

- A Duloxetine
- B Carbamazepine
- C Capsaicin
- D Sodium valproate
- E Amitriptyline

A Duloxetine

There is no indication of peripheral vascular disease, and the most likely diagnosis appears to be peripheral neuropathy. NICE guidelines recommend duloxetine, amitriptyline or gabapentin as potential initial therapies. Duloxetine is preferred to amitryptiline because it is associated with a lower risk of urinary retention.

B Carbamazepine

This is thought to be less effective than amitryptiline and is associated with increased risk of hyponatraemia.

C Capsaicin

It is a topical agent used for the treatment of neuropathy in addition to systemic agents, or for patients who are unable to take them.

D Sodium valproate

Sodium valproate is an alternative therapy for peripheral diabetic neuropathy, but isn't recommended as a first-line option by NICE guidelines.

E Amitriptyline

This isn't preferred here because of a higher risk of urinary retention versus duloxetine.

A 25-year-old woman comes to the clinic with her 5-month-old baby. Over the past few weeks she has been feeling increasingly tired, but the GP has dismissed the problem as the usual tiredness after having a baby. She tells you she feels tired, has put on weight and is constipated all the time, feeling the cold when she goes out. On further questioning, she tells you this wasn't always the case, and that in fact during the first few months she actually felt like she had more energy and could survive on hardly any sleep at all. On examination her BP is 142/70 mmHg, with pulse is 65/min. Her BMI is 28. You notice that her hair and skin are quite dry.

Investigations:

Hb	10.9 g/dl
WCC	6.7 $\times 10^9$/l
PLT	190 $\times 10^9$/l
Na^+	140 mmol/l
K^+	4.9 mmol/l
Creatinine	100 µmol/l
Cholesterol	6.2 mmol/l
TSH	7.1 U/l
Free T4	7.1 pmol/l
Anti-thyroid antibody	+ve

Which of the following is the most likely diagnosis?

A	Graves' disease
B	Subacute thyroiditis
C	Hashimoto's thyroiditis

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mmHg, with pulse is 65/min. Her BMI is 28. You notice that her hair and skin are quite dry.

Investigations:

Hb	10.9 g/dl
WCC	6.7 x10⁹/l
PLT	190 x10⁹/l
Na⁺	140 mmol/l
K⁺	4.9 mmol/l
Creatinine	100 µmol/l
Cholesterol	6.2 mmol/l
TSH	7.1 U/l
Free T4	7.1 pmol/l
Anti-thyroid antibody	+ve

Which of the following is the most likely diagnosis?

A Graves' disease

B Subacute thyroiditis

C Hashimoto's thyroiditis

D Post-partum thyroiditis

E Sick euthyroid syndrome

PLT	190 x10^9/l
Na$^+$	140 mmol/l
K$^+$	4.9 mmol/l
Creatinine	100 µmol/l
Cholesterol	6.2 mmol/l
TSH	7.1 U/l
Free T4	7.1 pmol/l
Anti-thyroid antibody	+ve

Which of the following is the most likely diagnosis?

Your answer was correct

A	Graves' disease
B	Subacute thyroiditis
C	Hashimoto's thyroiditis
D	Post-partum thyroiditis
E	Sick euthyroid syndrome

Explanation

D Post-partum thyroiditis

The history here suggests that an early period of possible thyrotoxicosis has now been followed with symptoms of hypothyroidism, with hypothyroidism confirmed on

Explanation

D Post-partum thyroiditis

The history here suggests that an early period of possible thyrotoxicosis has now been followed with symptoms of hypothyroidism, with hypothyroidism confirmed on biochemical testing. The timing after the birth of her child suggests this is post-partum thyroiditis. Treatment is with thyroxine replacement, although withdrawal may be possible in some patients who recover normal thyroid function. Recurrence of thyroiditis is common in subsequent pregnancies, however, and in up to 40% permanent hypothyroidism develops. The presence of anti-thyroid antibodies does put her at higher risk of permanent hypothyroidism.

A Graves' disease

Graves' disease is characterised by thyrotoxicosis rather than the picture of hypothyroidism seen here.

B Subacute thyroiditis

Subacute thyroiditis is associated with symptoms of a flu-like illness and pain over the thyroid gland. An initial period of thyrotoxicosis is followed by transient hypothyroidism and then recovery.

C Hashimoto's thyroiditis

Hashimoto's disease is the main differential here, although this patient's recent pregnancy makes post-partum thyroiditis more likely.

E Sick euthyroid syndrome

Sick euthyroid syndrome is associated with a significant

A 24-year-old woman presents to the clinic with recurrent palpitations. She continues to hold down her job as a nurse on the Cardiology Ward of the local hospital but feels increasingly tired. There is no past medical history of note and her only medication is the oral contraceptive pill.

On examination, her BP is 122/72 mmHg, with pulse 70/min and regular. Her BMI is 25. Her TSH is 0.15 mU/l (0.4–5), free T4 is 20.0 pmol/l (10–22) and free T3 is 9.3 pmol/l (5–10).

Which of the following is the most likely diagnosis?

A Subclinical thyrotoxicosis

B Pituitary failure

C Sick euthyroid syndrome

D Addison's disease

E Thyrotoxicosis factitia

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Your answer was correct

A	Subclinical thyrotoxicosis
B	Pituitary failure
C	Sick euthyroid syndrome
D	Addison's disease
E	Thyrotoxicosis factitia

Explanation

A Subclinical thyrotoxicosis

The TSH is below the lower limit of normal, and the T3 and T4 are at the upper limit of the normal range. This picture fits best with a diagnosis of subclinical thyrotoxicosis. Patients with subclinical thyrotoxicosis are at increased risk of incident atrial fibrillation and coronary heart disease

A Subclinical thyrotoxicosis

The TSH is below the lower limit of normal, and the T3 and T4 are at the upper limit of the normal range. This picture fits best with a diagnosis of subclinical thyrotoxicosis. Patients with subclinical thyrotoxicosis are at increased risk of incident atrial fibrillation and coronary heart disease (although ischaemic events are very unlikely in a patient of this age). At this stage no treatment is indicated, although thyroid function tests should be repeated in another 2-3 months.

B Pituitary failure

Pituitary failure would be associated with a low TSH, and T3 and T4 below the lower limit of normal. Other features such as postural hypotension would also be expected.

C Sick euthyroid syndrome

Sick euthyroid syndrome is associated with a significant non-thyroidal illness, where T3 and T4 are reduced; recovery is spontaneous and no intervention is required.

D Addison's disease

Addison's is usually associated with a hypothyroid picture on blood testing.

E Thyrotoxicosis factitia

Although this patient having taken a small dose of thyroid hormone can't be excluded, abuse of thyroid hormone is more likely to lead to T4 outside the upper limit of the normal range.

A type-2 diabetic man presents to the diabetic clinic as a new patient referred from his GP. He has a past history of hypertension, heart failure and hypothyroidism. His BMI is 36. He is currently on metformin 500 mg bd and has excellent compliance. He was previously on gliclazide in addition to metformin, but this was stopped when he was admitted to hospital following a collapse. His $HbA1_c$ is 85.79 mmol/mol (10%).

Which one of the following treatments would be the most suitable?

A Add in Pioglitazone

B Add in glimepiride

C Add in liraglutide

D Add in nocturnal isophane insulin

E Increase metformin to 1g bd

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Which one of the following treatments would be the most suitable?

Your answer was correct

A	Add in Pioglitazone
B	Add in glimepiride
C	Add in liraglutide
D	Add in nocturnal isophane insulin
E	Increase metformin to 1g bd

Explanation

C Add in liraglutide

Despite excellent compliance with treatment, this patient's $HbA1_c$ remains well above the target range at 85.79 mmol/mol (10%). As treatment intensification with a sulphonylurea or pioglitazone is contraindicated in this case, and the patient's BMI is greater than 35, NICE

C Add in liraglutide

Despite excellent compliance with treatment, this patient's $HbA1_c$ remains well above the target range at 85.79 mmol/mol (10%). As treatment intensification with a sulphonylurea or pioglitazone is contraindicated in this case, and the patient's BMI is greater than 35, NICE advocates the use of a GLP-1 agonist such as liraglutide. Liraglutide binds to and activates the GLP-1 receptor to increase insulin secretion, suppress glucagon secretion and slow gastric emptying. This should only be continued if a patient has a reduction in HbA1c of at least 11 mmol/mol and a weight loss of at least 3% of initial body weight in 6 months.

A Add in Pioglitazone

Pioglitazone is contraindicated in this patient due to the history of heart failure.

B Add in glimepiride

Sulphonylureas would usually be used as a second-line treatment in addition to metformin. However, the patient has already previously been on a sulphonylurea which was stopped due to an episode of collapse. It is therefore unlikely that a sulphonylurea would be trialled again due to the risk of hypoglycaemia.

D Add in nocturnal isophane insulin

The addition of insulin to the patient's current dose of metformin may be the best way to improve his $HbA1_c$. The most common way to do this is to introduce a once-daily, bedtime injection of long-acting insulin to be given in addition to the patient's current oral hypoglycaemic agents (for example, Humulin I). However, the implication in this

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D	Add in nocturnal isophane insulin

The addition of insulin to the patient's current dose of metformin may be the best way to improve his HbA1$_c$. The most common way to do this is to introduce a once-daily, bedtime injection of long-acting insulin to be given in addition to the patient's current oral hypoglycaemic agents (for example, Humulin I). However, the implication in this question is that the patient has previously had a problem with hypoglycaemia. Insulin should therefore be avoided unless absolutely necessary.

E	Increase metformin to 1g bd

It is very unlikely that the patient will reach the target HbA1$_c$ of 7.5% or lower through monotherapy, and increasing the dose of metformin further is more likely to result in GI side effects.

A 45-year-old man comes to the clinic for review. He has been referred by his GP for an obvious slowly enlarging mass in the left lobe of the thyroid. He is concerned he might have cancer.

Which of the following would increase the likelihood in this patient of underlying thyroid malignancy?

A Family history of hyperthyroidism

B Strong family history of breast cancer requiring multiple check-up mammograms

C Abuse of thyroid tablets as a teenager

D Family history of familial adenomatous polyposis (FAP)

E Male sex

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Explanation

D	Family history of familial adenomatous polyposis (FAP)

FAP is caused by an APC gene mutation on chromosome 5, and is also associated with increased risk of developing thyroid cancer.

B	Strong family history of breast cancer requiring multiple check-up mammograms

A familial history of breast cancer is most closely associated with increased risk of ovarian cancer.

A	Family history of hyperthyroidism

Endemic goitre, Hashimoto's thyroiditis and thyroid adenoma, not hyperthyroidism, are associated with increased risk of thyroid malignancy.

C	Abuse of thyroid tablets as a teenager

Thyrotoxicosis factitia, or abuse of thyroid hormone, is not associated with increased risk of thyroid cancer.

E	Male sex

Females are three times more likely to develop thyroid cancer than males.

A pregnant lady at 26 weeks of gestation has clinical evidence of hyperthyroidism. She is very anxious and complains of palpitations, heat intolerance and difficulty maintaining her weight during the pregnancy. On examination her BP is 120/70 mmHg, with pulse 95/min regular. There is no obvious goitre on neck examination.

Investigations:

Hb	11.9 g/dl
WCC	5.4 x10^9/l
PLT	190 x10^9/l
Na$^+$	140 mmol/l
K$^+$	4.5 mmol/l
Creatinine	94 µmol/l
TSH	<0.05 U/l (<0.5-4.5)
Anti-thyroid antibodies	+ve

How would you propose to manage her?

A Carbimazole

B Radioiodine

C Propylthiouracil

D Propranolol

E Prednisolone

B Radioiodine

This is contraindicated in pregnancy because of accumulation in both the fetal thyroid and the mother's thyroid gland.

C Propylthiouracil

Propylthiouracil is now rarely used in late pregnancy because of case reports of maternal hepatotoxicity.

D Propranolol

Although propranolol will treat symptoms of thyrotoxicosis, it won't significantly impact on the risk of miscarriage.

E Prednisolone

Prednisolone doesn't significantly impact on the progression of autoimmune thyrotoxicosis in pregnancy and therefore has no role here.

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A 45-year-old lady had some blood tests as part of a medical examination for life insurance. She is completely well and takes no regular medication. Apparently another member of her family is noted to have high calcium levels, but has required no intervention.

Investigations:

Corrected calcium	2.88 mmol/l

Her GP therefore added some blood tests, which were as follows:

Parathyroid hormone (PTH)	4.7 pmol/l (0.9-5.4)
Urinary calcium-to-creatinine ratio	< 0.01, indicating relative hypocalciuria
Serum ACE	30 U/l (25-82)

Which of the following is the most likely diagnosis?

A	Bronchial carcinoma
B	Primary hyperparathyroidism
C	Familial hypocalciuric hypercalcaemia (FHH)
D	Sarcoidosis
E	Paget's disease

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Explanation

C Familial hypocalciuric hypercalcaemia (FHH)

This lady is well but has elevated calcium. Her parathyroid hormone and serum ACE are normal. Her calcium-to-creatinine ratio is <0.01, indicating reduced excretion of calcium. This is characteristic of FHH, which is a defect in the calcium-sensing receptor (plasma membrane G-protein coupled receptor). No treatment is usually needed. FHH is characterised by hypercalcaemia, relative hypocalciuria, slight hypermagnesaemia and inappropriately normal to high levels of PTH.

A Bronchial carcinoma

Squamous cell carcinoma of the bronchus is associated with production of parathyroid hormone-related PTH (PTHrP), which is a cause of hypercalcaemia, but should actually suppress endogenous PTH production. Other features suggestive of bronchial carcinoma, such as a cough or smoking history, are also absent in this scenario.

B Primary hyperparathyroidism

Relative hypocalciuria was previously thought to differentiate between primary hyperparathyroidism and FHH, although population analyses of patients with primary hyperparathyroidism cast doubt on this as a differentiating factor. The inheritance pattern indicating other affected family members does, however, support a diagnosis of FHH.

D Sarcoidosis

Where there is significant sarcoid disease activity, leading to a raised serum calcium, angiotensin-converting enzyme levels are usually elevated. Normal levels seen here count

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D	Sarcoidosis

Where there is significant sarcoid disease activity, leading to a raised serum calcium, angiotensin-converting enzyme levels are usually elevated. Normal levels seen here count against sarcoidosis as the cause of hypercalcaemia.

E	Paget's disease

Paget's disease is associated with elevated alkaline phosphatase and joint pain, and is usually only associated with hypercalcaemia when patients spend a significant period of time recumbent in bed.

A 55-year-old man presents to his GP complaining of a cough and breathlessness that has been present for about 2 weeks. He reports that prior to the onset of these symptoms, he was fit and well and was not on any medication. He is a known smoker of 10 cigarettes per day and has been smoking for over 25 years. On examination, the GP was unable to elicit any positive clinical signs and diagnosed a mild viral chest infection and reassured the patient that the symptoms would settle of their own accord. Two weeks later, the patient then presented again to the GP, this time complaining of thirst, polyuria and generalised muscle weakness. His blood pressure was elevated at 155/95 mmHg. The GP noticed the presence of ankle oedema. A prick test confirmed the presence of hyperglycaemia and the patient was referred to the hospital for investigations where the medical registrar ordered a variety of blood tests.

Some of these results are shown below:

Na^+	144 mmol/l
K^+	2.2 mmol/l
Bicarbonate	34 mmol/l
Glucose	16 mmol/l

What is the most likely diagnosis?

A Ectopic ACTH production

B Cushing's disease

C Dermatomyositis

D Primary hyperaldosteronism

E Adrenal insufficiency

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Explanation

A Ectopic ACTH production

The suspicion here is that this patient has a small (oat) cell carcinoma of the lung which is a rapidly growing aggressive tumour characterised by early spread to distant sites. Patients often present with disseminated disease. A feature of this tumour is the range of paraneoplastic syndromes that occur due to the production of a variety of peptide hormones, the most common of which are the syndrome of inappropriate secretion of antidiuretic hormone (SIADH) and the syndrome of ectopic adrenocorticotropin hormone (ACTH) production. Typical features of Cushing's syndrome are often absent in these patients but they may present with pigmentation and weight loss accompanied by hyperglycaemia, hypokalaemia, a metabolic alkalosis and increased serum and urine cortisol concentrations.

B Cushing's disease

Given this patient is a known smoker with respiratory symptoms, ectopic ACTH production is more likely than a pituitary adenoma driving Cushing's disease.

C Dermatomyositis

Dermatomyositis is associated with proximal myopathy, but not with the other features of hyperadrenalism seen here including metabolic alkalosis and raised blood glucose.

D Primary hyperaldosteronism

Although the blood pressure is elevated, the hyperglycaemia seen here is more consistent with a diagnosis of elevated cortisol.

A 45-year-old contract painter presents for review. He consulted the GP complaining of tiredness and lethargy, abdominal pain and headaches. He works regularly on renovation jobs in old houses.

Only past history of note includes atenolol for hypertension and gout, which has become a recent problem over the past few months.

On examination, his BP is 138/80 mmHg, with pulse 72 and regular. He looks pale and has a peripheral neuropathy.

Investigations:

Hb	9.1 g/dl (hypochromic, microcytic anaemia)
WCC	9.7×10^9/l
PLT	173×10^9/l
Na^+	133 mmol/l
K^+	3.4 mmol/l
Creatinine	122 μmol/l
Uric acid	680 μmol/l

What diagnosis fits best with this clinical picture?

A	Acute interstitial nephritis
B	Lead poisoning
C	Hypertensive nephropathy
D	Pseudohypoaldosteronism
E	Atenolol use

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B Lead poisoning

C Hypertensive nephropathy

D Pseudohypoaldosteronism

E Atenolol use

Explanation

B Lead poisoning

The picture here, with hypochromic, microcytic anaemia, gout and hypokalaemia, fits best with lead poisoning. Lead nephropathy leads to proximal tubular defects including phosphate, amino acid and glucose loss in the urine. Pencillamine is one effective treatment for lead poisoning, promoting increased lead excretion; other options include dimercaptosuccinic acid (DMSA) and calcium disodium edetate. Reduced lead levels over time can result in a partial reversal of aldosterone resistance.

A Acute interstitial nephritis

Typically, acute interstitial nephritis begins abruptly, manifesting as acute kidney injury. In most instances, acute interstitial nephritis occurs within days of exposure to the offending drug. In some instances (particularly with nonsteroidal anti-inflammatory drugs [NSAIDs]), acute interstitial nephritis begins after several months of exposure. Almost all acute interstitial nephritides are caused by hypersensitivity reactions to drugs and are not mediated by direct toxicity. Although any drug can potentially cause a hypersensitivity reaction involving the kidney, the following agents are the most frequently implicated:

- Antibiotics (e.g. penicillins, cephalosporins, sulfa drugs, quinolones)
- NSAIDs
- Diuretics (e.g. thiazides, furosemide)
- Allopurinol
- Phenytoin
- Rifampin
- Interferon alfa
- Proton pump inhibitors.

nephropathy tend to have disproportionately worse hyperuricaemia compared to patients with other kidney diseases, because of the unique effects of lead on urate metabolism, and, consequently, gout is common.

D	Pseudohypoaldosteronism

Pseudohypoaldosteronism comprises a heterogeneous group of disorders of electrolyte metabolism characterised by an apparent state of renal tubular unresponsiveness or resistance to the action of aldosterone. It is manifested by hyperkalaemia, metabolic acidosis and a normal glomerular filtration rate (GFR). In our case, there is mild hypokalaemia and reduced

GFR; therefore, the diagnosis of pseudohypoaldosteronism is unlikely.

E	Atenolol use

Atenolol is unlikely to have caused the kidney disease; however, dose adjustment is required according to the patient's creatinine clearance.

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A 72-year-old woman comes to the clinic for review. She has difficult-to-control hypertension and impaired glucose tolerance. She also suffers from regular snoring and often stops breathing at night.

A blood test for insulin-like growth factor 1 (IGF-1) is markedly elevated.

Her external appearance is shown below.

A magnetic resonance imaging (MRI) scan reveals a 4-mm pituitary adenoma.

Which of the following is the most appropriate intervention?

- A Bromocriptine
- B Ketoconazole
- C Nocturnal continuous positive airway pressure (CPAP)
- D Pioglitazone
- E Pituitary adenomectomy

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Which of the following is the most appropriate intervention?

Your answer was correct

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B	Ketoconazole
C	Nocturnal continuous positive airway pressure (CPAP)
D	Pioglitazone
E	Pituitary adenomectomy

Explanation

E	Pituitary adenomectomy

This patient has symptoms of acromegaly, with the biochemistry consistent with the diagnosis, (impaired glucose tolerance and raised IGF-1) and a positive MRI scan. Progression to surgery, usually via a trans-sphenoidal approach, is the most appropriate intervention.

Ketoconazole can be used to suppress adrenal corticosteroid production. It can be used to treat resistant symptoms of Cushing syndrome in patients with adrenal carcinoma.

C	Nocturnal continuous positive airway pressure (CPAP)

The symptoms of sleep apnoea in this case are related to acromegaly and are likely to improve significantly post-surgery. CPAP may, in some cases, still be required, but the patient should be reassessed once a biochemical cure has been achieved.

D	Pioglitazone

Pioglitazone is an insulin sensitiser; it has been shown in studies to reduce the progression of impaired glucose tolerance to diabetes, but it does not have an indication for the condition. In this case, glucose tolerance is likely to normalise after surgery and no medical intervention is required.

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A 27-year-old woman is brought to the Emergency room by the police. She is convinced that her husband is trying to poison her. Her husband tells you that she is hardly sleeping and seems almost hyperactive at present. She has a first child who is 4 months old. On examination her BP is 150/85 mmHg, with a pulse of 100/min and atrial fibrillation.

Investigations:

Hb	12.5 g/dl
WCC	5.7 x10^9/l
PLT	282 x10^9/l
Na^+	139 mmol/l
K^+	4.8 mmol/l
Creatinine	90 µmol/l
TSH	<0.05 U/l
T4	31.2 nmol/l
Anti-microsomal antibody	+

Which of the following is the most likely diagnosis?

A Hashimoto's thyroiditis

B Graves' disease

C Post-partum thyroiditis

D Post-natal depression

E Atrophic thyroiditis
]

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- A Hashimoto's thyroiditis
- B Graves' disease
- C Post-partum thyroiditis
- D Post-natal depression
- E Atrophic thyroiditis

Explanation

C Post-partum thyroiditis

Post-partum thyroiditis presents with hyperthyroidism in around 1/3 of sufferers some 1-4 months post-pregnancy. In rare cases thyrotoxicosis may be associated with a psychotic presentation, as seen here. The period of hyperthyroidism is followed by hypothyroidism and then resolution of the condition in the majority of patients; however, 1/3 of women develop permanent hypothyroidism, in which case permanent thyroid

C Post-partum thyroiditis

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A Hashimoto's thyroiditis

The time of presentation is more consistent with post-partum thyroiditis, and patients with Hashimoto's present with hypo-, not hyperthyroidism.

B Graves' disease

Graves' disease is associated with TSH receptor antibodies, not anti-microsomal antibodies.

D Post-natal depression

Post-partum psychosis can be excluded because of the abnormal thyroid function tests, suggesting that the psychological disturbance is related to thyrotoxicosis.

E Atrophic thyroiditis

Atrophic thyroiditis is rare, occurs in women aged 40-60 years and is associated with hypothyroidism.

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A 45-year-old woman presents to her GP complaining of a progressively hoarse voice for about 6 weeks. She denies any recent upper respiratory tract infections and is a non-smoker. She has no other symptoms and is normally very fit and well. She is not on any medications. The positive findings on examination include a palpable, firm, non-tender nodule in the thyroid area that moves with swallowing. The nodule measures about 1 cm across and has a hard consistency and ill-defined borders. No lymphadenopathy is felt. The GP suspects this to be a thyroid lump and arranges further investigations for the patient.

Which of the following best describes a thyroid nodule which is suspected to be malignant?

A Chest radiography, CT scanning and/or MRI are commonly used in the initial work-up of a thyroid nodule

B Follicular thyroid carcinoma is the most common cancer of the thyroid gland

C Follicular thyroid carcinoma is part of the multiple endocrine neoplasia syndrome

D The prognosis is best for follicular cancers

E Papillary cancers carry a good prognosis

E Papillary cancers carry a good prognosis

Papillary carcinoma is the most common form of well-differentiated thyroid cancer, and the most common form of thyroid cancer to result from exposure to radiation. Papillary carcinoma appears as an irregular, solid or cystic mass or nodule in a normal thyroid parenchyma.

The life expectancy of patients with this cancer is related to their age. The prognosis is better for younger patients than for patients who are older than 45 years.

Fine-needle aspiration biopsy is considered the best first-line diagnostic procedure for a thyroid nodule. Surgery is the definitive management of papillary thyroid cancer. Approximately 4–6 weeks after surgical thyroid removal, patients may have radioiodine therapy to detect and destroy any metastasis and residual tissue in the thyroid.

A Chest radiography, CT scanning and/or MRI are commonly used in the initial work-up of a thyroid nodule

CXR, CT and MRI are not usually used in the initial work-up of a patient with a thyroid nodule, except in clear cases of metastatic disease. The first imaging study that is performed in any patient with a thyroid nodule is ultrasonography, which further characterises the nodules' U grading and determines the need for biopsy.

B Follicular thyroid carcinoma is the most common cancer of the thyroid gland

Papillary carcinoma is the most common thyroid carcinoma and, in general, the prognosis for this carcinoma is excellent.

C Follicular thyroid carcinoma is part of the multiple

Question 46 of 51

A 45-year-old Pakistani lady is referred to the Endocrine Clinic with bone pain. She has progressively become weaker, and she now finds it difficult to get up.

On examination, she has 3/5 power in shoulder abduction and adduction but 5/5 power in all other muscle groups in the arms. In the legs, she has 3/5 power in hip flexion and extension but normal power in the rest of the legs. Her plantar reflexes are flexor.

Investigations:

Hb	13.0 g/dl
WCC	8.0×10^9/l
PLT	150×10^9/l
Na^+	135 mmol/l
K^+	4.3 mmol/l
Urea	5.9 mmol/l
Creatinine	96 micromol/l
ALT	45 mmol/l
Cl^-	109 mmol/l
Bilirubin	17 µmol/l
ALP	590 U/l
Albumin	36 g/l
PO_4^{3-}	0.6 mmol/l
HCO_3^-	19.0 mmol/l
Corrected Ca^{++}	2.02 mmol/l

What is the most likely underlying cause of her clinical picture?

A Type 1 renal tubular acidosis

WCC	8.0×10^9/l
PLT	150×10^9/l
Na^+	135 mmol/l
K^+	4.3 mmol/l
Urea	5.9 mmol/l
Creatinine	96 micromol/l
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What is the most likely underlying cause of her clinical picture?

A	Type 1 renal tubular acidosis
B	Hypoparathyroidism
C	Osteomalacia
D	Hypothyroidism
E	Polymyalgia rheumatica (PMR)

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What is the most likely underlying cause of her clinical picture?

Your answer was correct

A	Type 1 renal tubular acidosis
B	Hypoparathyroidism
C	Osteomalacia
D	Hypothyroidism
E	Polymyalgia rheumatica (PMR)

Explanation

C Osteomalacia

The clinical picture is one of bone pain and proximal myopathy. The blood tests show a mild hypocalcaemia and hypophosphataemia associated with a high alkaline phosphatase, which is typical of osteomalacia. There is also an acidosis, which is caused by the inhibition of phosphate,

C Osteomalacia

The clinical picture is one of bone pain and proximal myopathy. The blood tests show a mild hypocalcaemia and hypophosphataemia associated with a high alkaline phosphatase, which is typical of osteomalacia. There is also an acidosis, which is caused by the inhibition of phosphate, bicarbonate and sodium reabsorption by parathyroid hormone (PTH). Osteomalacia is more common in ethnic groups who are dark-skinned, or in those cover themselves up so that cholesterol cannot be converted to vitamin D in the skin. Asians who eat chapattis are also at risk, as the phytic acid in the chapattis chelates vitamin D and calcium. X-rays may show Looser's zones, which are areas of decalcification.

A Type 1 renal tubular acidosis

Type 1 renal tubular acidosis is associated with hypokalaemia, which is not seen here.

B Hypoparathyroidism

Hypoparathyroidism is associated with elevated levels of phosphate, which doesn't fit the biochemical picture seen here.

D Hypothyroidism

Although hypothyroidism is associated with proximal myopathy, it is not associated with the low serum calcium and elevated alkaline phosphatase seen here.

E Polymyalgia rheumatica (PMR)

PMR is associated with proximal muscle pain and weakness, but not with the abnormalities in calcium metabolism seen here.

A 43-year-old man is referred to the clinic because of attending Emergency after a road traffic accident. He admits that he did not see the car approaching from the right which hit him, and had been bumping into things at home. On examination in the Emergency department he was noted to have bilateral peripheral visual field loss. Past history of note includes lethargy and difficulties at work, for which his GP has referred him to a counsellor, and erectile dysfunction for which he has been trialling sildenafil. On review in the clinic his BP is 110/70 mmHg, with pulse 70/min regular. There are no abnormal findings on general examination, but neurological examination confirms peripheral visual field loss.

Investigations:

Hb	12.9 g/dl
WCC	7.8 $\times 10^9$/l
PLT	192 $\times 10^9$/l
Na^+	134 mmol/l
K^+	5.5 mmol/l
Creatinine	121 µmol/l
TSH	0.4 U/l (<0.5-4.5)
Free T_4	7.8 pmol/l (10-22)
Testosterone	7 nmol/l (9-35)
Prolactin	1510 mU/l (<360)
IGF-1	5.0 nmol/l (5.6-23.3)
MRI pituitary	Macroadenoma with pressure on the optic chiasm

Which of the following is the most appropriate management?

Question 47 of 51

Hb	12.9 g/dl
WCC	7.8 x10^9/l
PLT	192 x10^9/l
Na^+	134 mmol/l
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MRI pituitary	Macroadenoma with pressure on the optic chiasm

Which of the following is the most appropriate management?

A	Radiotherapy
B	Hypophysectomy
C	Somatostatin
D	Cabergoline
E	Adenomectomy

Rana Alnasser's screen

E Adenomectomy

This man has a pituitary macroadenoma with significant optic chiasm compression. On reviewing his investigations his sodium is low, he has mildly elevated potassium, his TSH and T4 are low, testosterone is low and IGF-1 is below the lower end of the normal range. Probably due to pressure effects, the prolactin is elevated. Putting these results together, the most likely diagnosis is a non-functioning macroadenoma. A minority of patients respond to either dopamine agonists or somatostatin analogues, so in this situation surgery is the treatment of choice.

A Radiotherapy

Radiotherapy is used in cases of pituitary adenomas where medical or surgical therapy has failed.

B Hypophysectomy

It is usually performed in cases of cancer or tumours that resist other forms of treatment, especially craniopharyngiomas.

C Somatostatin

Somatostatin analogues are used for the management of acromegaly (growth hormone-secreting pituitary adenomas).

D Cabergoline

Cabergoline is a dopamine agonist used for the treatment of prolactin-secreting pituitary adenomas

A 32-year-old woman is referred to the Pregnancy Diabetes Clinic by your colleagues in Obstetrics, having failed a trial of 2 weeks' diet and exercise. Her first child was large at birth, and in retrospect it is thought that she may previously have had gestational diabetes. She is now 20 weeks' pregnant. She has no prior medical history of note.

Investigations:

Fasting plasma glucose	6.9 mmol/l
Oral glucose tolerance test at 2 h	11.4 mmol/l

What is the most appropriate next step in this case?

A	Oral glibenclamide
B	Diet and exercise advice only
C	Oral metformin
D	Basal bolus insulin therapy
E	Oral acarbose

C457

A 32-year-old woman is referred to the Pregnancy Diabetes Clinic by your colleagues in Obstetrics, having failed a trial of 2 weeks' diet and exercise. Her first child was large at birth, and in retrospect it is thought that she may previously have had gestational diabetes. She is now 20 weeks' pregnant. She has no prior medical history of note.

Investigations:

Fasting plasma glucose	6.9 mmol/l
Oral glucose tolerance test at 2 h	11.4 mmol/l

What is the most appropriate next step in this case?

Your answer was correct

- A Oral glibenclamide
- B Diet and exercise advice only
- C Oral metformin
- D Basal bolus insulin therapy
- E Oral acarbose

Explanation

C Oral metformin

This woman has gestational diabetes, as evidenced by a raised fasting and 2 h blood glucose. Abnormal glucose tolerance occurs as a *de novo* event in around 2–3% of pregnant women; unfortunately their long-term risk of

Explanation

C Oral metformin

This woman has gestational diabetes, as evidenced by a raised fasting and 2 h blood glucose. Abnormal glucose tolerance occurs as a *de novo* event in around 2–3% of pregnant women; unfortunately their long-term risk of subsequent type 2 diabetes is as high as 40–50%. The aim of treatment is to keep blood glucose readings to around 7 mmol/l or below, and to allow mothers to give birth normally (although a number should deliver at 38 weeks' gestation due to excess fetal growth). Women should be offered a further glucose tolerance test at the 6-week check, to rule out the possibility of continued abnormal glucose tolerance or type 2 diabetes.

Studies have demonstrated that where metformin is instigated as initial therapy, maternal and fetal outcomes are no worse than where patients are prescribed insulin first line, and women gain less weight in pregnancy with greater overall treatment satisfaction scores.

A Oral glibenclamide

Although one trial has shown that glibenclamide is effective in controlling blood glucose in pregnancy, it is associated with weight gain and risk of hypoglycaemia, meaning that metformin is preferred.

B Diet and exercise advice only

Diet and exercise advice only runs the risk of uncontrolled hyperglycaemia and subsequent adverse fetal outcomes. This is particularly a problem as further weight gain in pregnancy will only exacerbate insulin resistance and worsen glycaemic control.

D Basal bolus insulin therapy

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B	Diet and exercise advice only

Diet and exercise advice only runs the risk of uncontrolled hyperglycaemia and subsequent adverse fetal outcomes. This is particularly a problem as further weight gain in pregnancy will only exacerbate insulin resistance and worsen glycaemic control.

D	Basal bolus insulin therapy

Basal bolus insulin therapy is the next intervention when blood glucose levels escape target despite maximal tolerated oral metformin.

E	Oral acarbose

Although oral acarbose does reduce GI carbohydrate absorption, no large trial of effectiveness in pregnancy has been carried out.

An 18-year-old woman with type 1 diabetes who has recently broken up with her boyfriend is brought to the Emergency room by ambulance. Her parents say that she has become increasingly drowsy and confused over the past 12 h. She is usually managed with a basal bolus insulin regime but examination of the hospital records reveals two previous admissions with DKA, and her most recent HbA1c was 80.33 mmol/mol (9.5%). On examination she is drowsy, confused and aggressive; her GCS is 14. Her BP is 95/65 mmHg, pulse 105/min and regular. She is apyrexial. Her respiratory rate is 31/min. There is vague abdominal pain on examination of the abdomen.

Investigations:

Hb	12.1 g/dl
WCC	6.7 $\times 10^9$/l
PLT	201 $\times 10^9$/l
Na^+	143 mmol/l
K^+	5.9 mmol/l
Creatinine	180 µmol/l
Glucose	34.1 mmol/l
Bicarbonate	13.0 mmol/l
pH	7.2
Urine (catheter)	Ketones +++, blood +, protein -

You begin an insulin infusion and appropriate IV fluid replacement. Which other therapy would you also instigate?

A	IV sodium bicarbonate
B	IV phosphate

respiratory rate is 31/min. There is vague abdominal pain on examination of the abdomen.

Investigations:

Hb	12.1 g/dl
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PLT	201 x10⁹/l
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You begin an insulin infusion and appropriate IV fluid replacement. Which other therapy would you also instigate?

A IV sodium bicarbonate

B IV phosphate

C S/c low-molecular weight heparin

D IV antibiotics

E IV mannitol

WCC	6.7 x10^{9}/l
PLT	201 x10^{9}/l
Na^{+}	143 mmol/l
K^{+}	5.9 mmol/l
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You begin an insulin infusion and appropriate IV fluid replacement. Which other therapy would you also instigate?

Your answer was correct

A IV sodium bicarbonate

B IV phosphate

C S/c low-molecular weight heparin

D IV antibiotics

E IV mannitol

Explanation

C S/c low-molecular weight heparin

C	S/c low-molecular weight heparin

Patients with diabetic ketoacidosis (DKA) are at increased risk of venous thromboembolism because of volume depletion, hyperglycaemia and their decreased conscious level. As such, standard prophylaxis against deep vein thrombosis is an important component of management.

A	IV sodium bicarbonate

Sodium bicarbonate is also not used routinely and is only recommended in severe acidosis or circulatory collapse as an adjunct to insulin and fluid resuscitation.

B	IV phosphate

Although extracellular phosphate may be depleted once insulin therapy is instigated, phosphate replacement isn't considered a routine component of the management of DKA.

D	IV antibiotics

The normal white count isn't consistent with signs of acute infection.

E	IV mannitol

IV mannitol has a role to play in the management of acute cerebral oedema, but in this case is only likely to exacerbate volume depletion.

21170

A 32-year-old woman presents with headaches, sweating, anxiety and palpitations. She states that members of her family on her father's side have had similar symptoms and have required surgery. She is also complaining of polydipsia and constipation.

On examination, her blood pressure is elevated at 165/92. She had two 24 h urinary collections for catecholamines, which were above the upper limit of normal. Her bone profile revealed:

Corr. Ca^{2+}	2.71 mmol/l (2.2-2.6 mmol/l)
Phosphate	1.1 mmol/l (0.8-1.5 mmol/l)
PTH	19 pmol/l (1.5-7.6 pmol/l)

Her physician would like to send her for genetic testing. Which condition would he like to test her for?

A Von Hippel-Landau disease

B MEN 2A

C MEN 2B

D MEN 1

E Familial hypocalciuric hypercalcaemia

- B MEN 2A
- C MEN 2B
- D MEN 1
- E Familial hypocalciuric hypercalcaemia

Explanation

B MEN 2A

Type 2 Multiple Endocrine Neoplasia (MEN 2) is a rare familial cancer syndrome caused by mutations in the *RET* proto-oncogene. It is inherited in an autosomal dominant fashion. MEN 2A patients present with phaeochromocytoma, parathyroid hyperplasia and medullary thyroid carcinoma.

A Von Hippel-Landau disease

Clinical hallmarks of this disease include the development of retinal and central nervous system haemangioblastomas, which are absent in this case. Moreover, hyperparathyroid hyperplasia is not part of the condition.

C MEN 2B

This condition is characterised by the presence of mucosal neuromas and marfanoid habitus, along with phaechromocytoma and medullary thyroid carcinoma.

D MEN 1

A Von Hippel-Landau disease

Clinical hallmarks of this disease include the development of retinal and central nervous system haemangioblastomas, which are absent in this case. Moreover, hyperparathyroid hyperplasia is not part of the condition.

C MEN 2B

This condition is characterised by the presence of mucosal neuromas and marfanoid habitus, along with phaechromocytoma and medullary thyroid carcinoma.

D MEN 1

The main components of MEN 1 are hyperparathyroidism and pituitary and pancreatic tumours. From the pituitary tumours, 25-90% are usually prolactinomas although growth hormone or ACTH secretion has also been described. The pancreatic tumours can be non-functioning, originating from the beta-cells (insulinoma) or originating from non-beta-cells and secreting other peptides such as glucagon, pancreatic polypeptide, somatostatin, chromogranin or gastrin.

E Familial hypocalciuric hypercalcaemia

This is a genetic condition caused in the majority of cases due to loss of function mutations in the calcium-sensing receptor (CaSR) gene, expressed in parathyroid and kidney tissue. The perceived lack of calcium levels by the parathyroid leads to constitutively high levels of parathyroid hormone and therefore hypercalcaemia. Urine calcium/creatinine ratio has to be less than 0.01 in order to consider this condition as a cause for primary hyperparathyroidism.

Medullary carcinoma of the thyroid

chromogranin or gastrin.

E	Familial hypocalciuric hypercalcaemia

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Medullary carcinoma of the thyroid

- Multiple endocrine neoplasia (MEN) type 2A: medullary carcinoma of the thyroid, phaeochromocytoma, hyperparathyroidism (inherited in autosomal dominant fashion)
- MEN type 2B: the above features which are found in MEN 2A and mucosal neuromas (most likely to be sporadic, although where inherited follows an autosomal dominant pattern).

They are inherited in an autosomal dominant fashion. Phaechromocytomas are also associated with other conditions: von Hippel-Lindau disease, neurofibromatosis, and tuberous sclerosis.

32882

A 62-year-old man presents to the clinic with increasing anxiety, palpitations and heat intolerance. He has lost 3 kg in weight over the past month. He is taking long-term maintenance amiodarone therapy at a dose of 200 mg daily, along with warfarin because of a low ejection fraction due to previous myocardial infarction, and two previous episodes of paroxysmal ventricular tachycardia. He has refused an ICD in the past. On examination his BP is 123/82 mmHg, with pulse 95/min. His BMI is 21. There are bilateral crackles at both lung bases consistent with mild cardiac failure.

Investigations:

Hb	12.4 g/dl
WCC	6.1 x10^9/l
PLT	199 x10^9/l
Na$^+$	139 mmol/l
K$^+$	4.5 mmol/l
Creatinine	132 µmol/l
TSH	<0.05 U/l
Thyroid uptake scan	normal
Thyroid autoantibodies	+ve

Which of the following is the most appropriate treatment for this patient?

A	Carbimazole
B	Subtotal thyroidectomy
C	Lugol's iodine
D	Radioactive iodine

amiodarone. Optimal management of AIT type 1 involves the use of high-dose thionamides and discontinuation of the amiodarone if possible. Given that this man is taking amiodarone for VT, the possibility of an ICD should be re-discussed. Without discontinuation of amiodarone, persistently high levels of iodine reduce the effectiveness of therapy.

B	Subtotal thyroidectomy

Any thyroid surgery is likely to carry significant risks in this patient because of poor cardiac function, and should therefore be avoided.

C	Lugol's iodine

Lugol's iodine is a short-term measure designed to treat hyperthyroidism, allowing for a window of intervention for surgery.

D	Radioactive iodine

Radioactive iodine is usually ineffective in managing AIT type 1 due to the excess iodine afforded by long-term amiodarone treatment.

E	Propranolol

This would impact on symptoms but may exacerbate cardiac failure. It wouldn't treat the underlying thyrotoxicosis.

Question 51 of 51

A 62-year-old man presents to the clinic with increasing anxiety, palpitations and heat intolerance. He has lost 3 kg in weight over the past month. He is taking long-term maintenance amiodarone therapy at a dose of 200 mg daily, along with warfarin because of a low ejection fraction due to previous myocardial infarction, and two previous episodes of paroxysmal ventricular tachycardia. He has refused an ICD in the past. On examination his BP is 123/82 mmHg, with pulse 95/min. His BMI is 21. There are bilateral crackles at both lung bases consistent with mild cardiac failure.

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Which of the following is the most appropriate treatment for this patient?

Your answer was correct

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B Subtotal thyroidectomy

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Kallman versus normal anatomyFigure 1: Kallman versus normal anatomy

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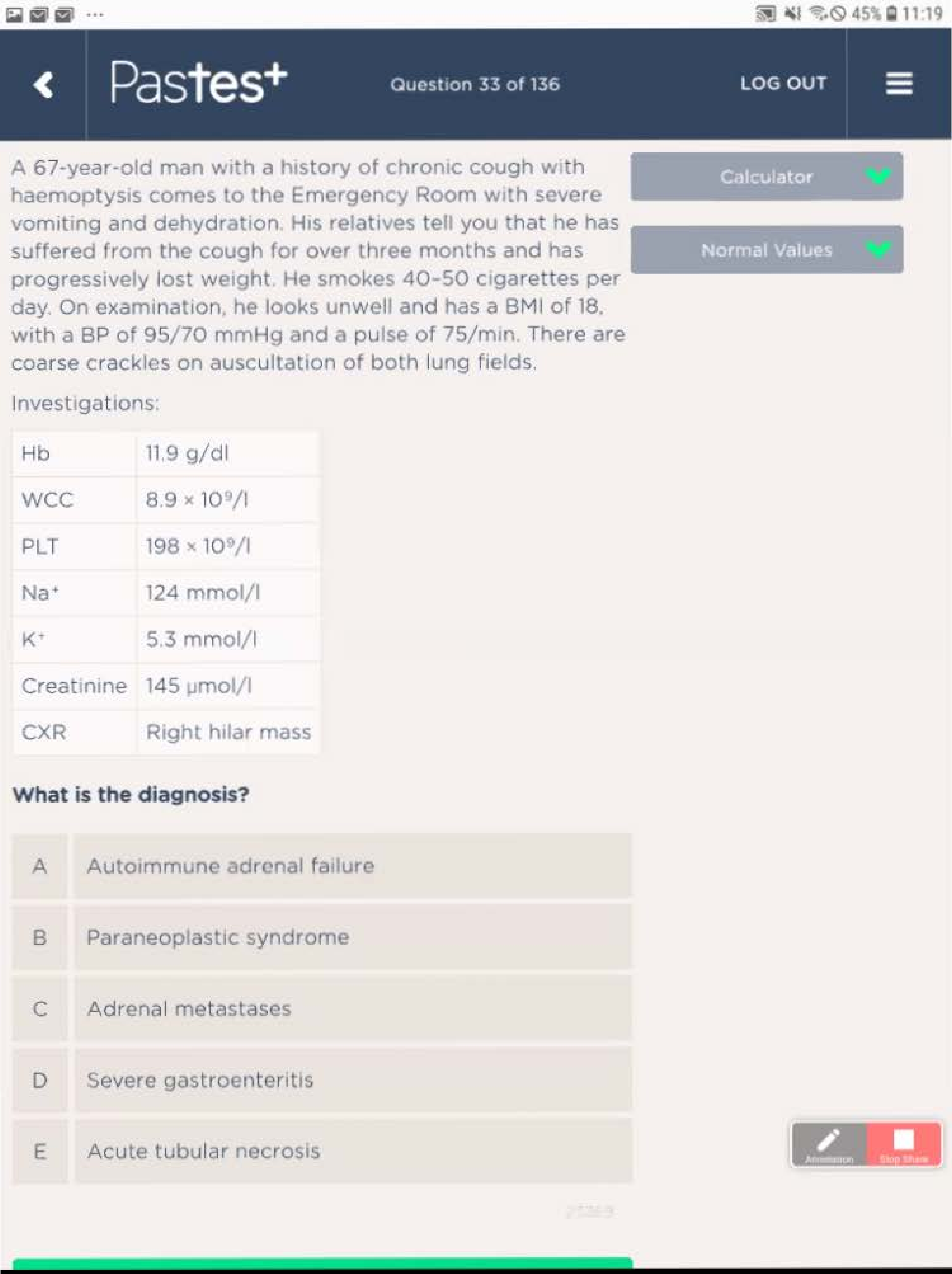


A 67-year-old man with a history of chronic cough with haemoptysis comes to the Emergency Room with severe vomiting and dehydration. His relatives tell you that he has suffered from the cough for over three months and has progressively lost weight. He smokes 40-50 cigarettes per day. On examination, he looks unwell and has a BMI of 18, with a BP of 95/70 mmHg and a pulse of 75/min. There are coarse crackles on auscultation of both lung fields.

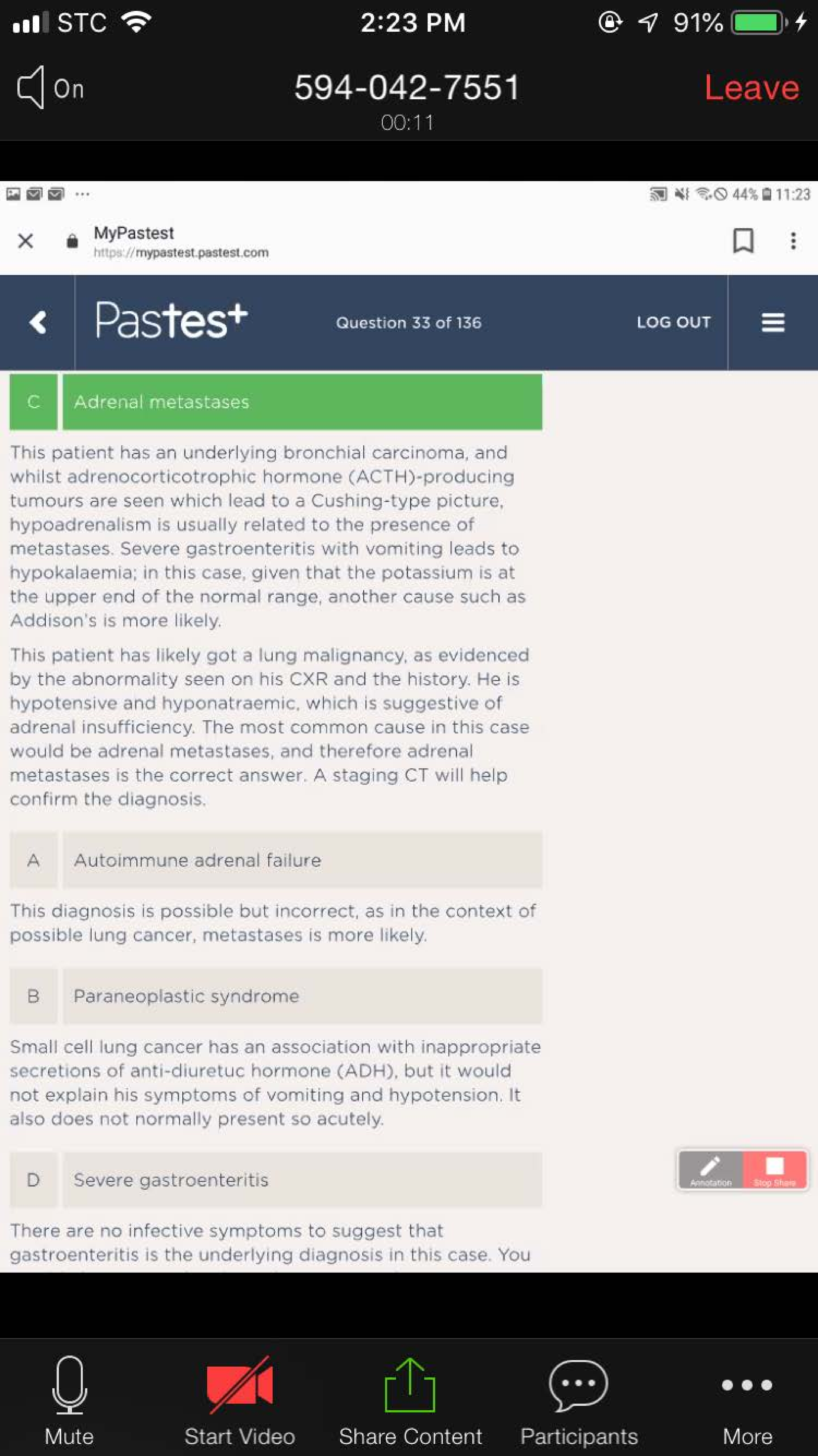
Investigations:

Hb	11.9 g/dl
WCC	8.9 × 10^9/l
PLT	198 × 10^9/l
Na^+	124 mmol/l
K^+	5.3 mmol/l
Creatinine	145 µmol/l
CXR	Right hilar mass

What is the diagnosis?

A	Autoimmune adrenal failure
B	Paraneoplastic syndrome
C	Adrenal metastases
D	Severe gastroenteritis
E	Acute tubular necrosis

Rana Alnasser's screen



C Adrenal metastases

This patient has an underlying bronchial carcinoma, and whilst adrenocorticotrophic hormone (ACTH)-producing tumours are seen which lead to a Cushing-type picture, hypoadrenalism is usually related to the presence of metastases. Severe gastroenteritis with vomiting leads to hypokalaemia; in this case, given that the potassium is at the upper end of the normal range, another cause such as Addison's is more likely.

This patient has likely got a lung malignancy, as evidenced by the abnormality seen on his CXR and the history. He is hypotensive and hyponatraemic, which is suggestive of adrenal insufficiency. The most common cause in this case would be adrenal metastases, and therefore adrenal metastases is the correct answer. A staging CT will help confirm the diagnosis.

A Autoimmune adrenal failure

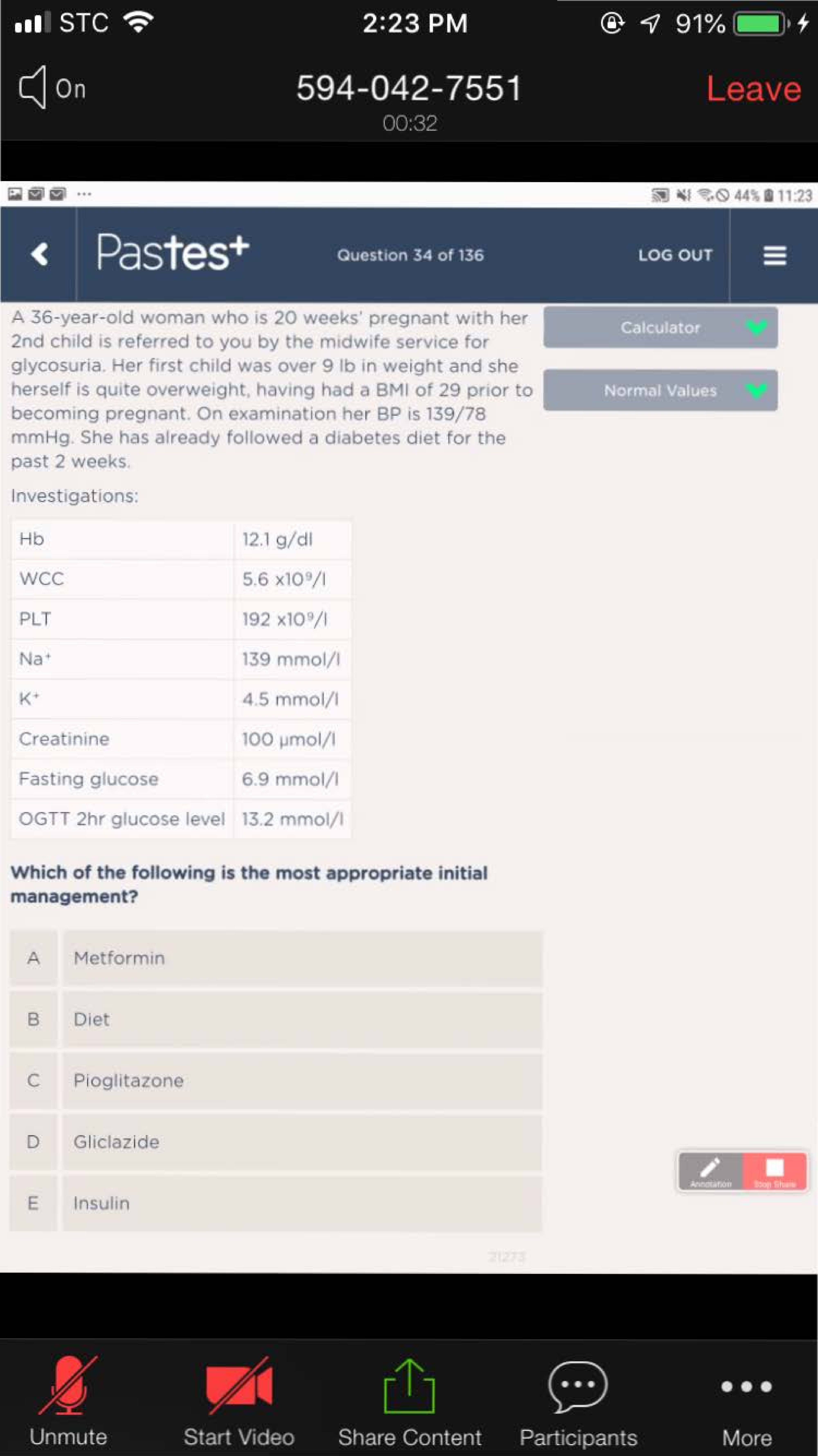
This diagnosis is possible but incorrect, as in the context of possible lung cancer, metastases is more likely.

B Paraneoplastic syndrome

Small cell lung cancer has an association with inappropriate secretions of anti-diuretuc hormone (ADH), but it would not explain his symptoms of vomiting and hypotension. It also does not normally present so acutely.

D Severe gastroenteritis

There are no infective symptoms to suggest that gastroenteritis is the underlying diagnosis in this case. You



A 36-year-old woman who is 20 weeks' pregnant with her 2nd child is referred to you by the midwife service for glycosuria. Her first child was over 9 lb in weight and she herself is quite overweight, having had a BMI of 29 prior to becoming pregnant. On examination her BP is 139/78 mmHg. She has already followed a diabetes diet for the past 2 weeks.

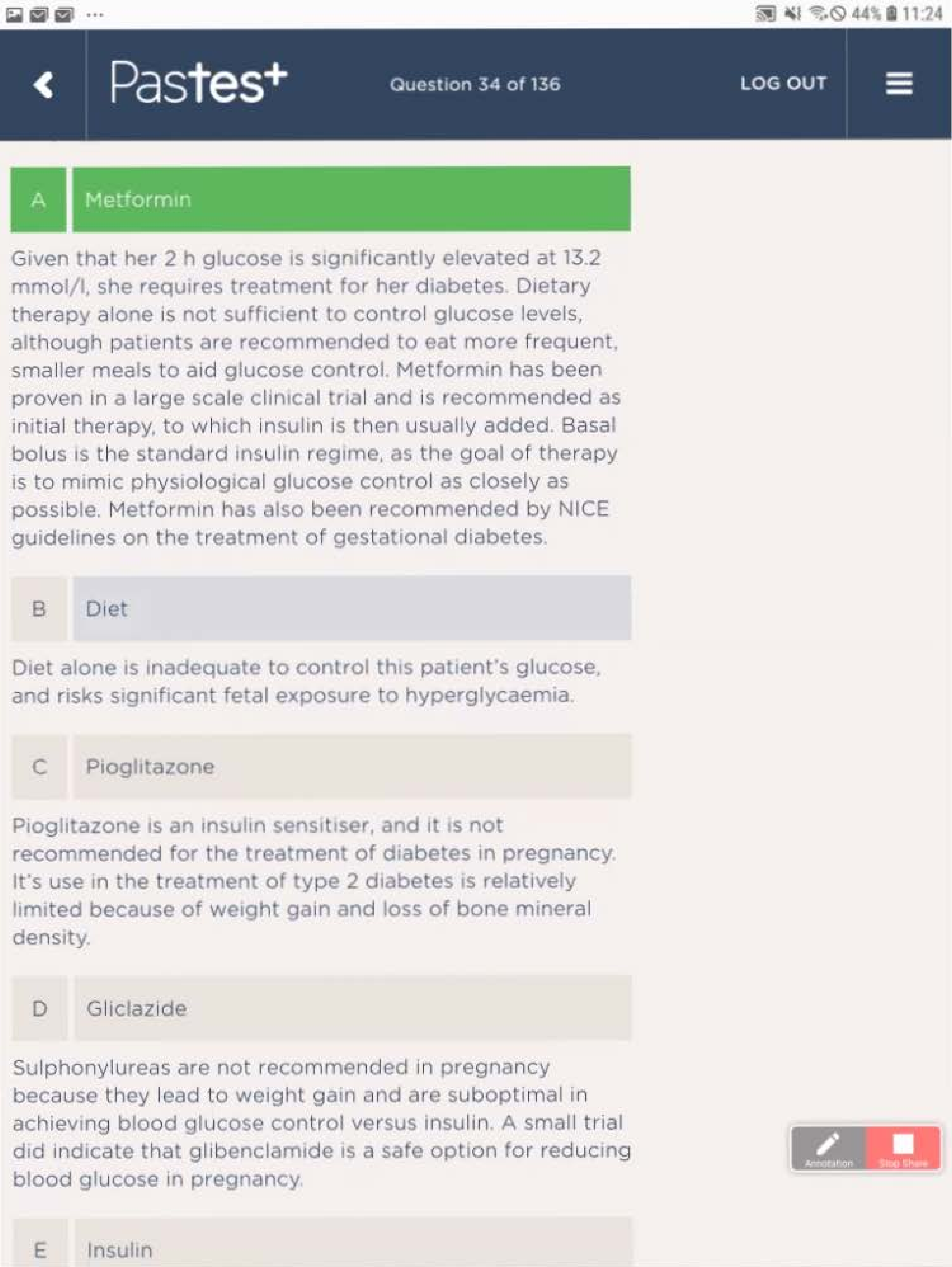
Investigations:

Hb	12.1 g/dl
WCC	5.6 x10^9/l
PLT	192 x10^9/l
Na$^+$	139 mmol/l
K$^+$	4.5 mmol/l
Creatinine	100 μmol/l
Fasting glucose	6.9 mmol/l
OGTT 2hr glucose level	13.2 mmol/l

Which of the following is the most appropriate initial management?

A	Metformin
B	Diet
C	Pioglitazone
D	Gliclazide
E	Insulin

21273



A Metformin

Given that her 2 h glucose is significantly elevated at 13.2 mmol/l, she requires treatment for her diabetes. Dietary therapy alone is not sufficient to control glucose levels, although patients are recommended to eat more frequent, smaller meals to aid glucose control. Metformin has been proven in a large scale clinical trial and is recommended as initial therapy, to which insulin is then usually added. Basal bolus is the standard insulin regime, as the goal of therapy is to mimic physiological glucose control as closely as possible. Metformin has also been recommended by NICE guidelines on the treatment of gestational diabetes.

B Diet

Diet alone is inadequate to control this patient's glucose, and risks significant fetal exposure to hyperglycaemia.

C Pioglitazone

Pioglitazone is an insulin sensitiser, and it is not recommended for the treatment of diabetes in pregnancy. It's use in the treatment of type 2 diabetes is relatively limited because of weight gain and loss of bone mineral density.

D Gliclazide

Sulphonylureas are not recommended in pregnancy because they lead to weight gain and are suboptimal in achieving blood glucose control versus insulin. A small trial did indicate that glibenclamide is a safe option for reducing blood glucose in pregnancy.

E Insulin

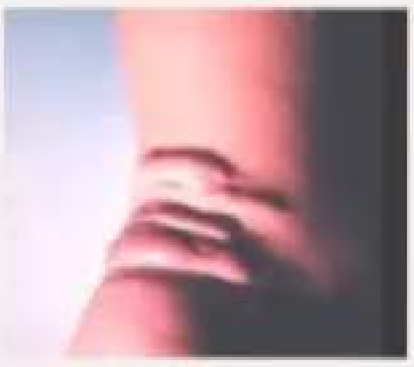
44% 11:25

Pastest+ Question 35 of 136 LOG OUT

A 37-year-old man undergoes examination as part of a 'well man' screening at his general practitioner's surgery. The lesion over his heel, shown below, was noted on examination.

Calculator

Normal Values



What would be your next investigation?

A Fasting lipids

B Fasting glucose

C Biopsy of lesion

D Serum uric acid

E Rheumatoid factor

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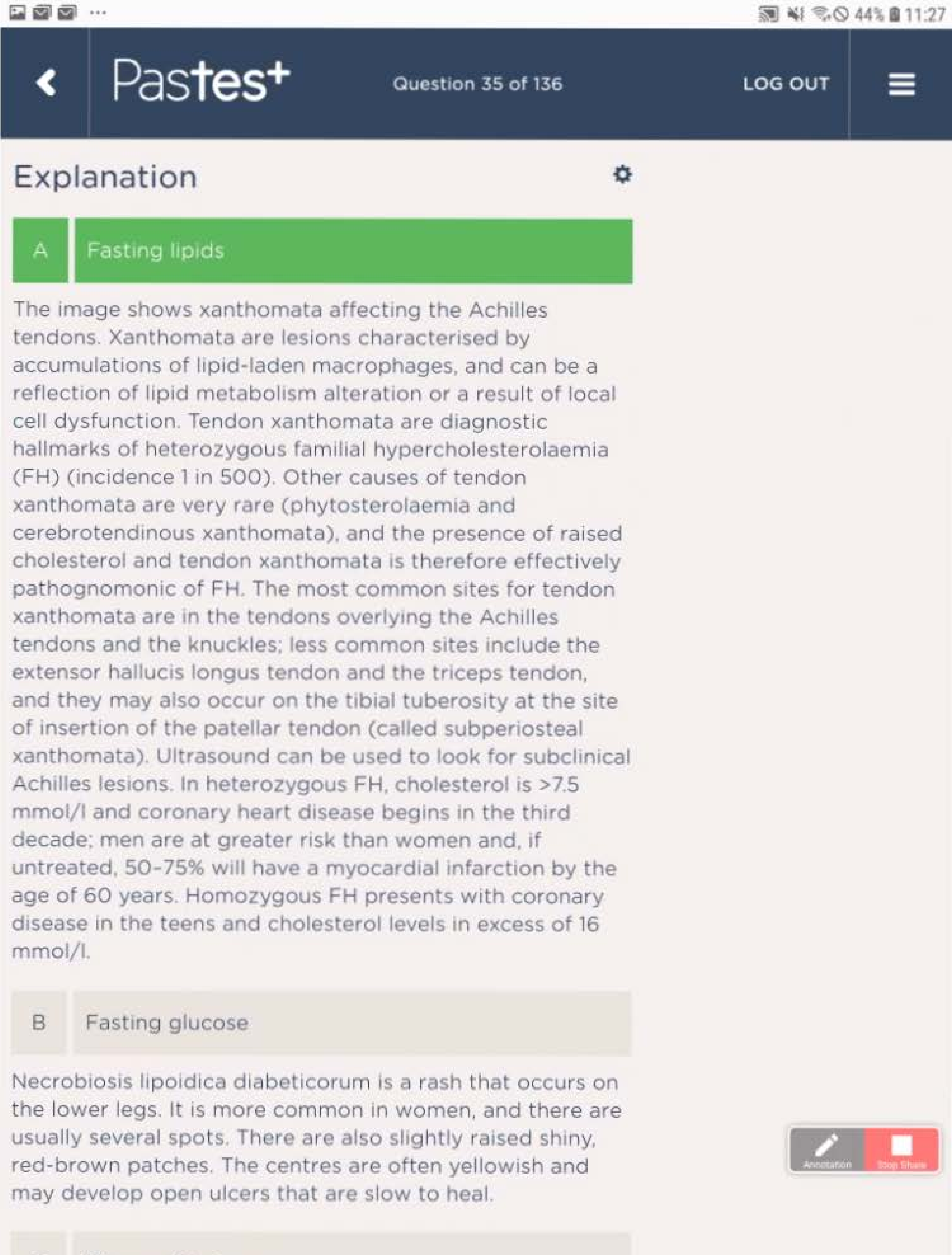
Rana Alnasser's screen



Explanation

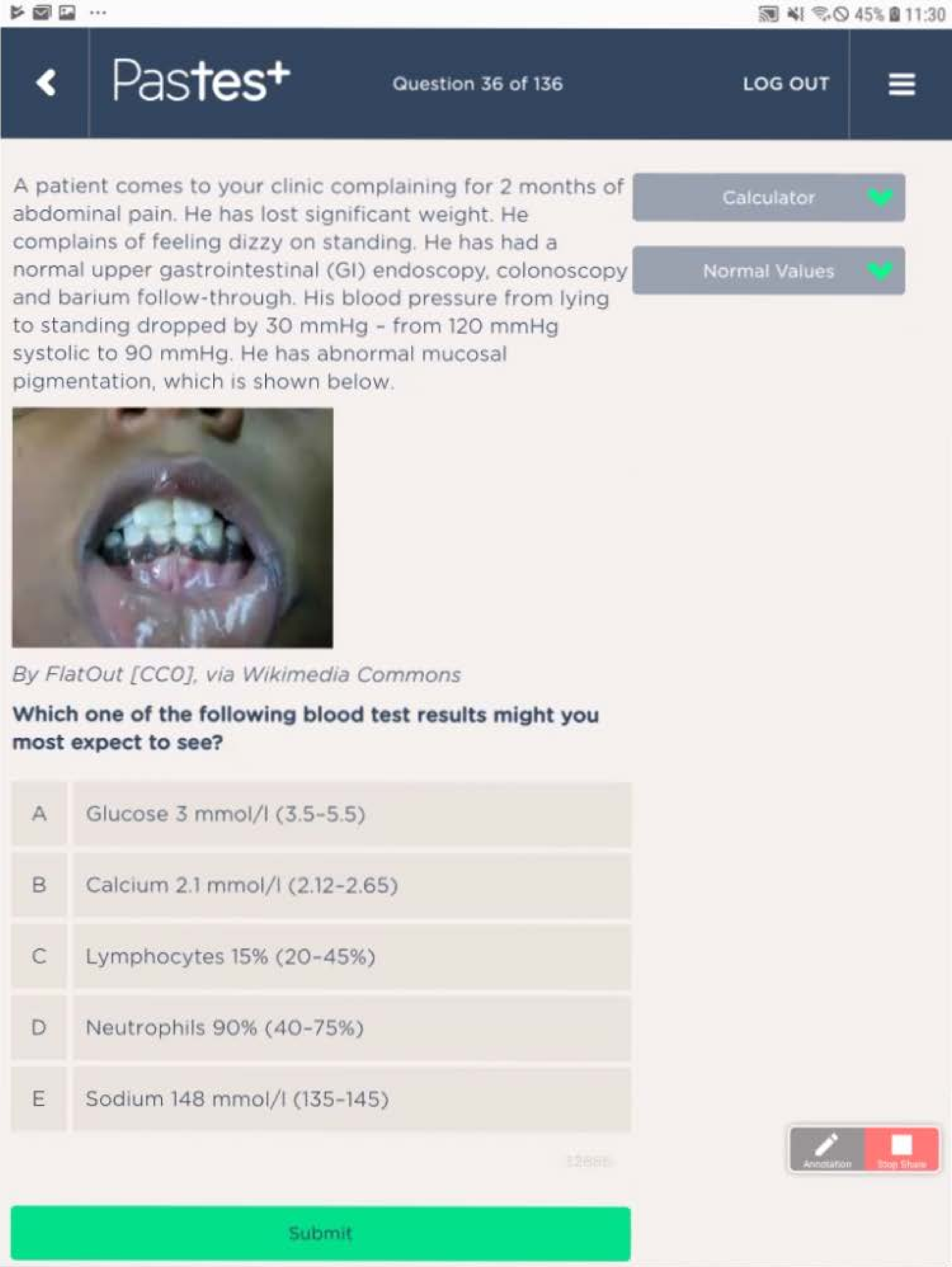
A **Fasting lipids**

The image shows xanthomata affecting the Achilles tendons. Xanthomata are lesions characterised by accumulations of lipid-laden macrophages, and can be a reflection of lipid metabolism alteration or a result of local cell dysfunction. Tendon xanthomata are diagnostic hallmarks of heterozygous familial hypercholesterolaemia (FH) (incidence 1 in 500). Other causes of tendon xanthomata are very rare (phytosterolaemia and cerebrotendinous xanthomata), and the presence of raised cholesterol and tendon xanthomata is therefore effectively pathognomonic of FH. The most common sites for tendon xanthomata are in the tendons overlying the Achilles tendons and the knuckles; less common sites include the extensor hallucis longus tendon and the triceps tendon, and they may also occur on the tibial tuberosity at the site of insertion of the patellar tendon (called subperiosteal xanthomata). Ultrasound can be used to look for subclinical Achilles lesions. In heterozygous FH, cholesterol is >7.5 mmol/l and coronary heart disease begins in the third decade; men are at greater risk than women and, if untreated, 50-75% will have a myocardial infarction by the age of 60 years. Homozygous FH presents with coronary disease in the teens and cholesterol levels in excess of 16 mmol/l.

B Fasting glucose

Necrobiosis lipoidica diabeticorum is a rash that occurs on the lower legs. It is more common in women, and there are usually several spots. There are also slightly raised shiny, red-brown patches. The centres are often yellowish and may develop open ulcers that are slow to heal.

C Biopsy of lesion



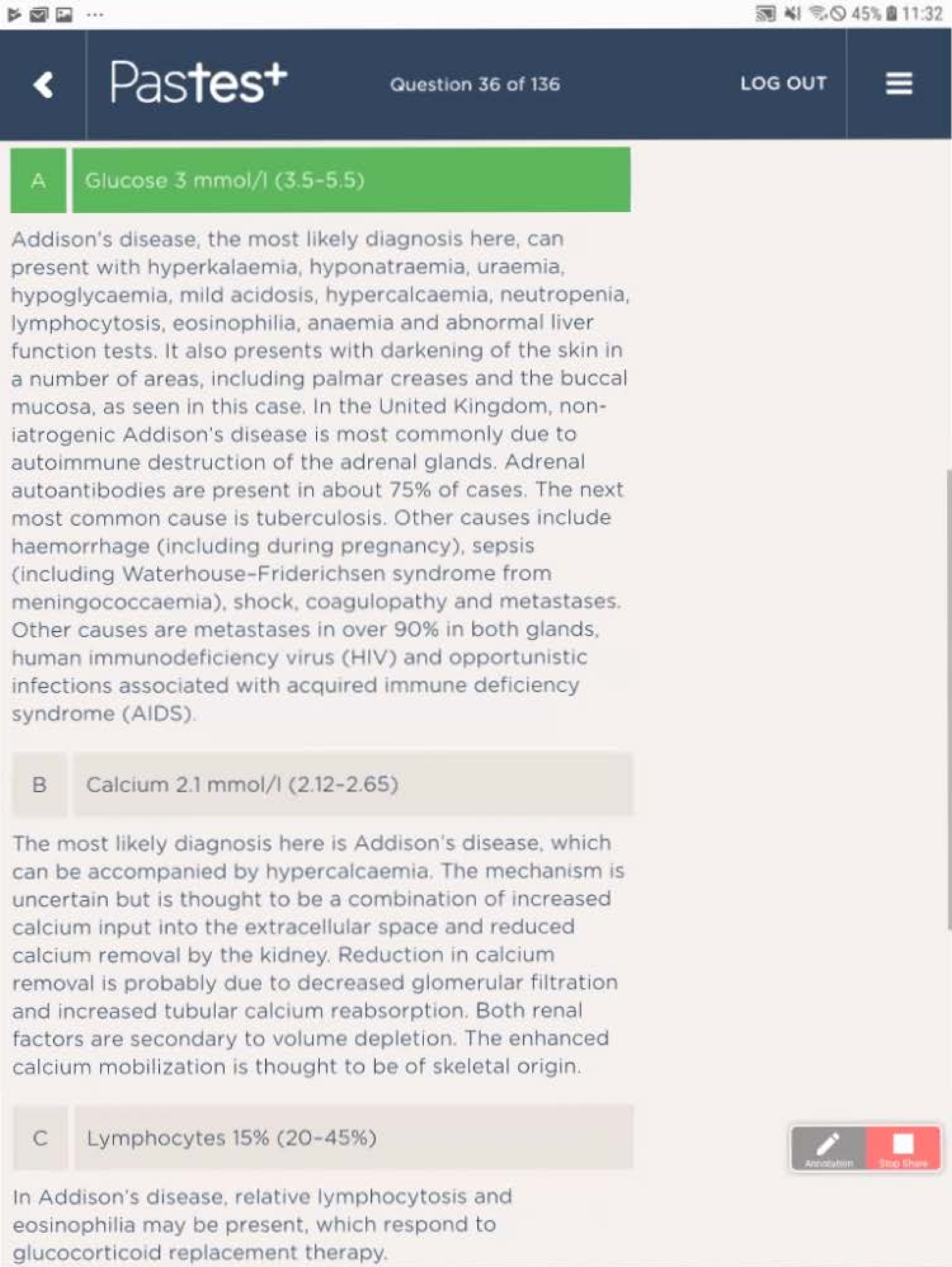
A patient comes to your clinic complaining for 2 months of abdominal pain. He has lost significant weight. He complains of feeling dizzy on standing. He has had a normal upper gastrointestinal (GI) endoscopy, colonoscopy and barium follow-through. His blood pressure from lying to standing dropped by 30 mmHg - from 120 mmHg systolic to 90 mmHg. He has abnormal mucosal pigmentation, which is shown below.

By FlatOut [CC0], via Wikimedia Commons

Which one of the following blood test results might you most expect to see?

A	Glucose 3 mmol/l (3.5-5.5)
B	Calcium 2.1 mmol/l (2.12-2.65)
C	Lymphocytes 15% (20-45%)
D	Neutrophils 90% (40-75%)
E	Sodium 148 mmol/l (135-145)

Rana Alnasser's screen



A Glucose 3 mmol/l (3.5-5.5)

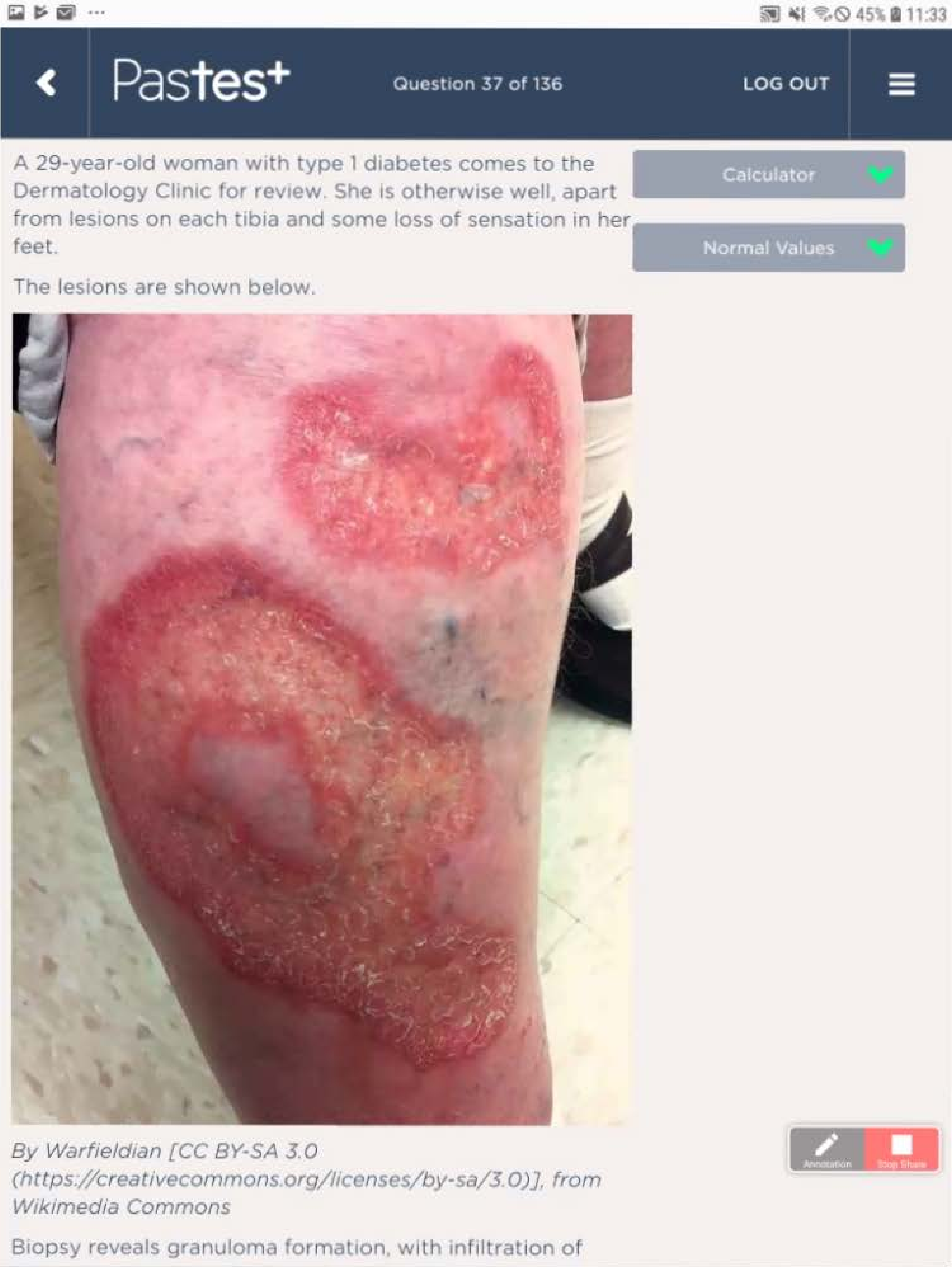
Addison's disease, the most likely diagnosis here, can present with hyperkalaemia, hyponatraemia, uraemia, hypoglycaemia, mild acidosis, hypercalcaemia, neutropenia, lymphocytosis, eosinophilia, anaemia and abnormal liver function tests. It also presents with darkening of the skin in a number of areas, including palmar creases and the buccal mucosa, as seen in this case. In the United Kingdom, non-iatrogenic Addison's disease is most commonly due to autoimmune destruction of the adrenal glands. Adrenal autoantibodies are present in about 75% of cases. The next most common cause is tuberculosis. Other causes include haemorrhage (including during pregnancy), sepsis (including Waterhouse-Friderichsen syndrome from meningococcaemia), shock, coagulopathy and metastases. Other causes are metastases in over 90% in both glands, human immunodeficiency virus (HIV) and opportunistic infections associated with acquired immune deficiency syndrome (AIDS).

B Calcium 2.1 mmol/l (2.12-2.65)

The most likely diagnosis here is Addison's disease, which can be accompanied by hypercalcaemia. The mechanism is uncertain but is thought to be a combination of increased calcium input into the extracellular space and reduced calcium removal by the kidney. Reduction in calcium removal is probably due to decreased glomerular filtration and increased tubular calcium reabsorption. Both renal factors are secondary to volume depletion. The enhanced calcium mobilization is thought to be of skeletal origin.

C Lymphocytes 15% (20-45%)

In Addison's disease, relative lymphocytosis and eosinophilia may be present, which respond to glucocorticoid replacement therapy.



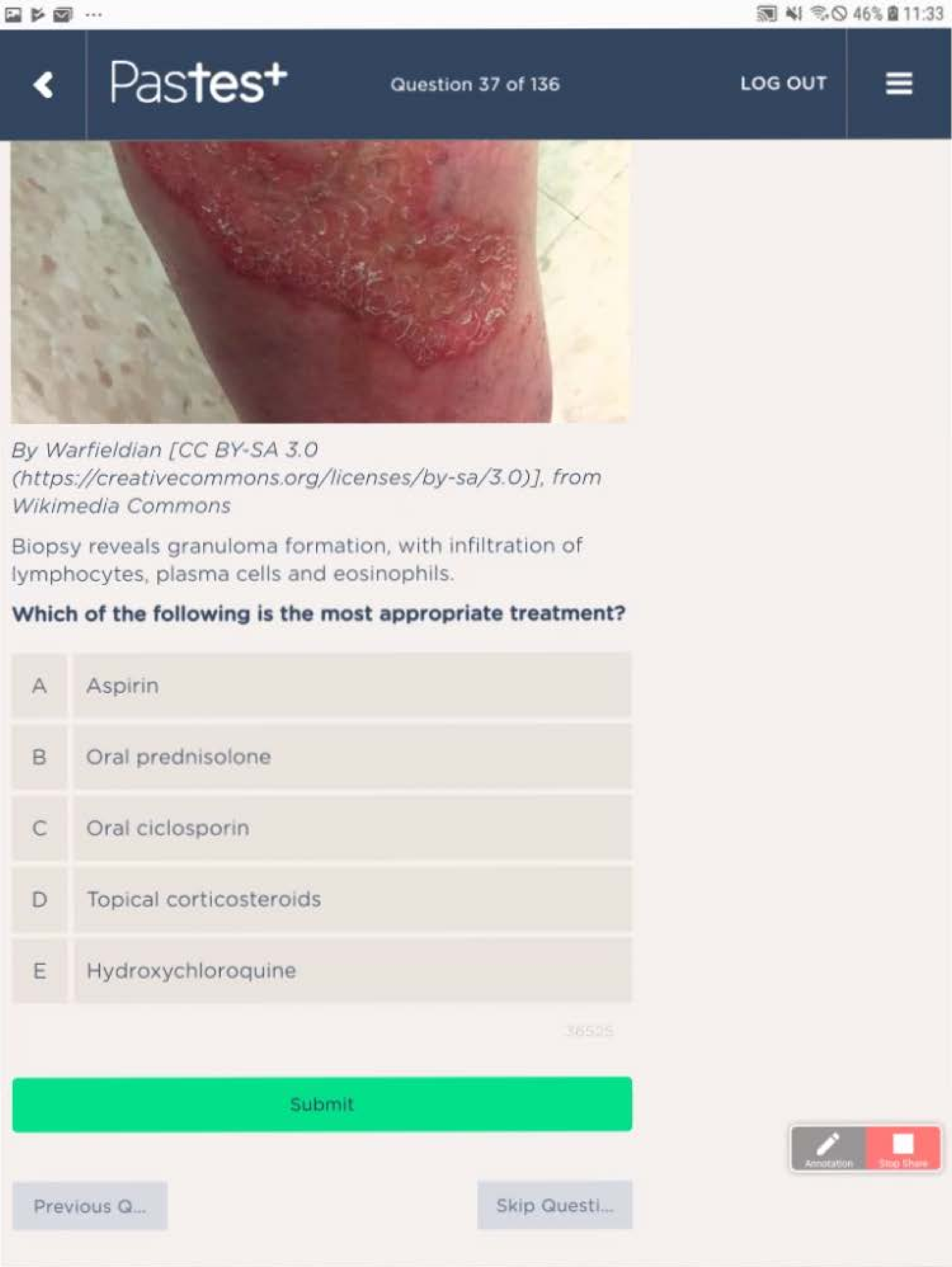
A 29-year-old woman with type 1 diabetes comes to the Dermatology Clinic for review. She is otherwise well, apart from lesions on each tibia and some loss of sensation in her feet.

The lesions are shown below.

By Warfieldian [CC BY-SA 3.0 (https://creativecommons.org/licenses/by-sa/3.0)], from Wikimedia Commons

Biopsy reveals granuloma formation, with infiltration of

Rana Alnasser's screen



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Biopsy reveals granuloma formation, with infiltration of lymphocytes, plasma cells and eosinophils.

Which of the following is the most appropriate treatment?

A Aspirin
B Oral prednisolone
C Oral ciclosporin
D Topical corticosteroids
E Hydroxychloroquine

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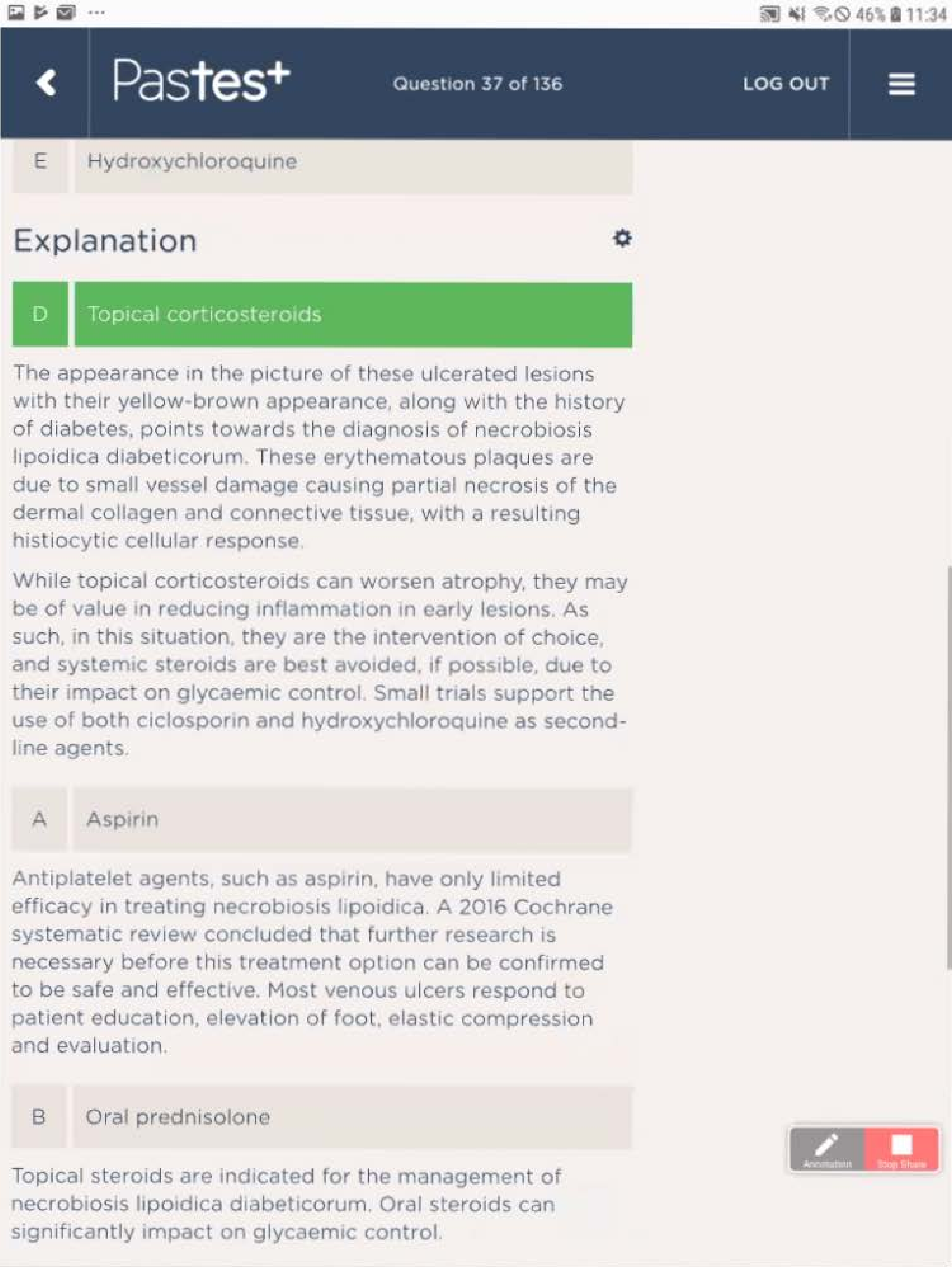


E Hydroxychloroquine

Explanation

D Topical corticosteroids

The appearance in the picture of these ulcerated lesions with their yellow-brown appearance, along with the history of diabetes, points towards the diagnosis of necrobiosis lipoidica diabeticorum. These erythematous plaques are due to small vessel damage causing partial necrosis of the dermal collagen and connective tissue, with a resulting histiocytic cellular response.

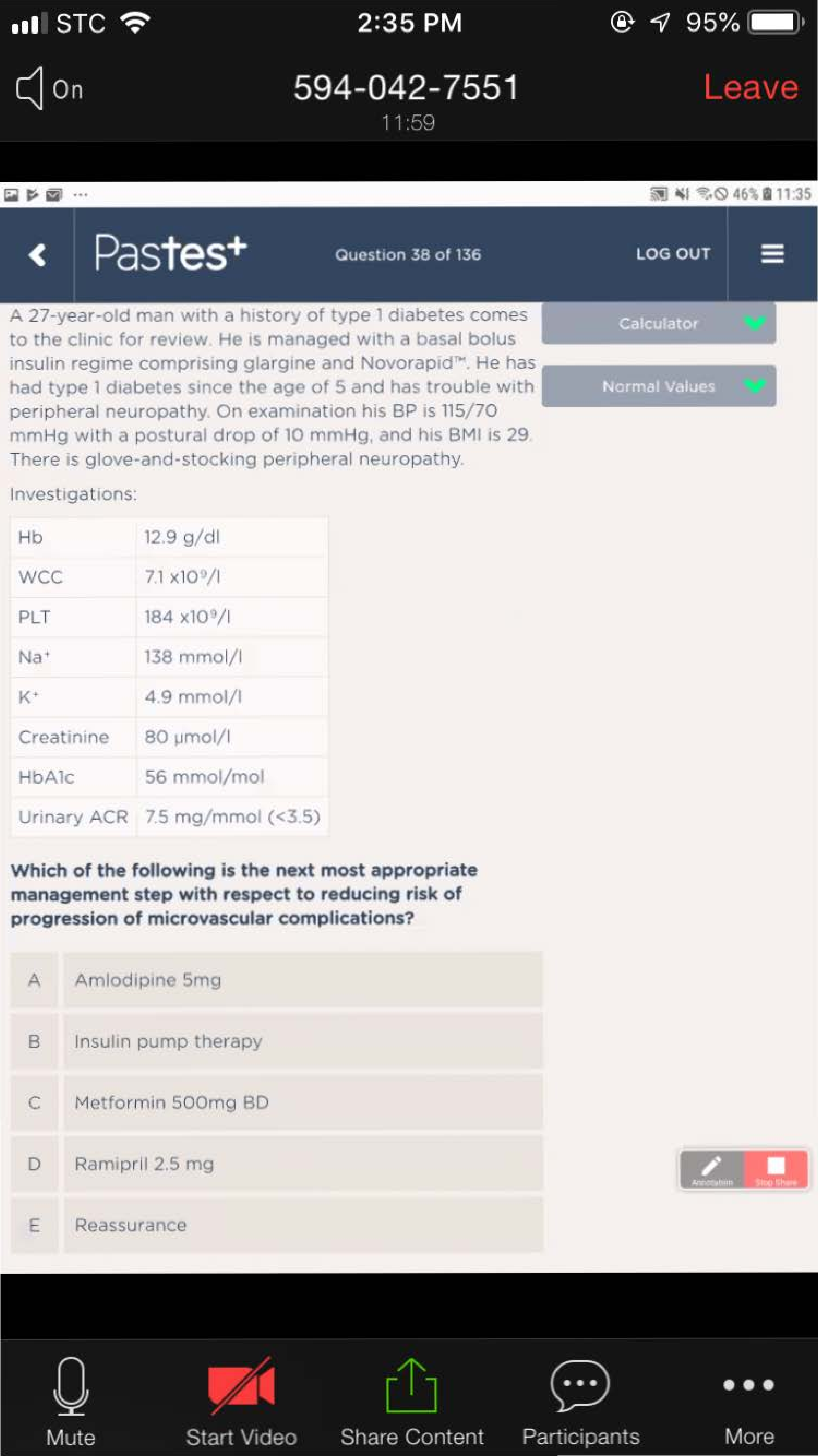
While topical corticosteroids can worsen atrophy, they may be of value in reducing inflammation in early lesions. As such, in this situation, they are the intervention of choice, and systemic steroids are best avoided, if possible, due to their impact on glycaemic control. Small trials support the use of both ciclosporin and hydroxychloroquine as second-line agents.

A Aspirin

Antiplatelet agents, such as aspirin, have only limited efficacy in treating necrobiosis lipoidica. A 2016 Cochrane systematic review concluded that further research is necessary before this treatment option can be confirmed to be safe and effective. Most venous ulcers respond to patient education, elevation of foot, elastic compression and evaluation.

B Oral prednisolone

Topical steroids are indicated for the management of necrobiosis lipoidica diabeticorum. Oral steroids can significantly impact on glycaemic control.



A 27-year-old man with a history of type 1 diabetes comes to the clinic for review. He is managed with a basal bolus insulin regime comprising glargine and Novorapid™. He has had type 1 diabetes since the age of 5 and has trouble with peripheral neuropathy. On examination his BP is 115/70 mmHg with a postural drop of 10 mmHg, and his BMI is 29. There is glove-and-stocking peripheral neuropathy.

Investigations:

Hb	12.9 g/dl
WCC	7.1 $\times10^9$/l
PLT	184 $\times10^9$/l
Na^+	138 mmol/l
K^+	4.9 mmol/l
Creatinine	80 µmol/l
HbA1c	56 mmol/mol
Urinary ACR	7.5 mg/mmol (<3.5)

Which of the following is the next most appropriate management step with respect to reducing risk of progression of microvascular complications?

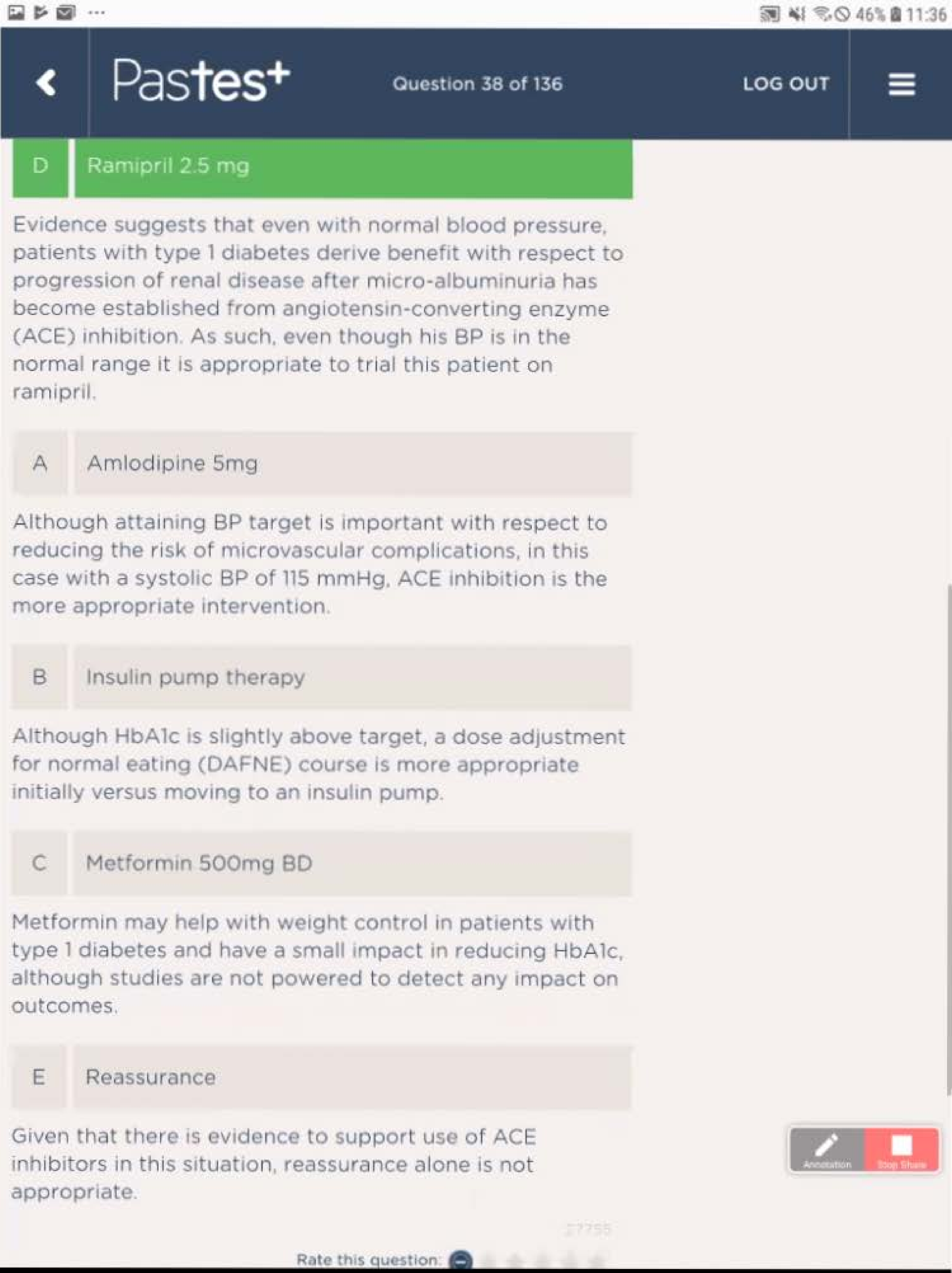
A Amlodipine 5mg

B Insulin pump therapy

C Metformin 500mg BD

D Ramipril 2.5 mg

E Reassurance



D Ramipril 2.5 mg

Evidence suggests that even with normal blood pressure, patients with type 1 diabetes derive benefit with respect to progression of renal disease after micro-albuminuria has become established from angiotensin-converting enzyme (ACE) inhibition. As such, even though his BP is in the normal range it is appropriate to trial this patient on ramipril.

A Amlodipine 5mg

Although attaining BP target is important with respect to reducing the risk of microvascular complications, in this case with a systolic BP of 115 mmHg, ACE inhibition is the more appropriate intervention.

B Insulin pump therapy

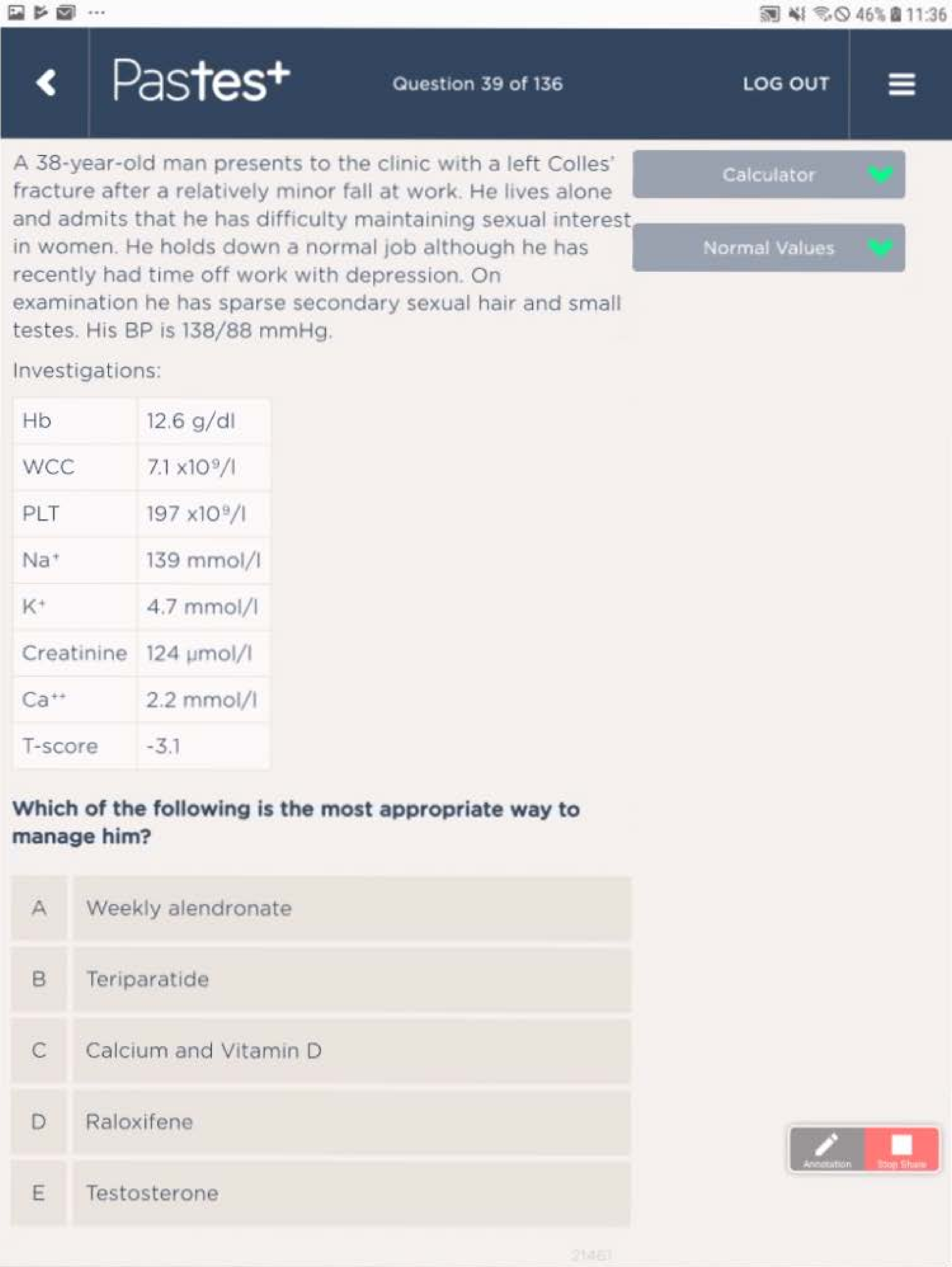
Although HbA1c is slightly above target, a dose adjustment for normal eating (DAFNE) course is more appropriate initially versus moving to an insulin pump.

C Metformin 500mg BD

Metformin may help with weight control in patients with type 1 diabetes and have a small impact in reducing HbA1c, although studies are not powered to detect any impact on outcomes.

E Reassurance

Given that there is evidence to support use of ACE inhibitors in this situation, reassurance alone is not appropriate.



A 38-year-old man presents to the clinic with a left Colles' fracture after a relatively minor fall at work. He lives alone and admits that he has difficulty maintaining sexual interest in women. He holds down a normal job although he has recently had time off work with depression. On examination he has sparse secondary sexual hair and small testes. His BP is 138/88 mmHg.

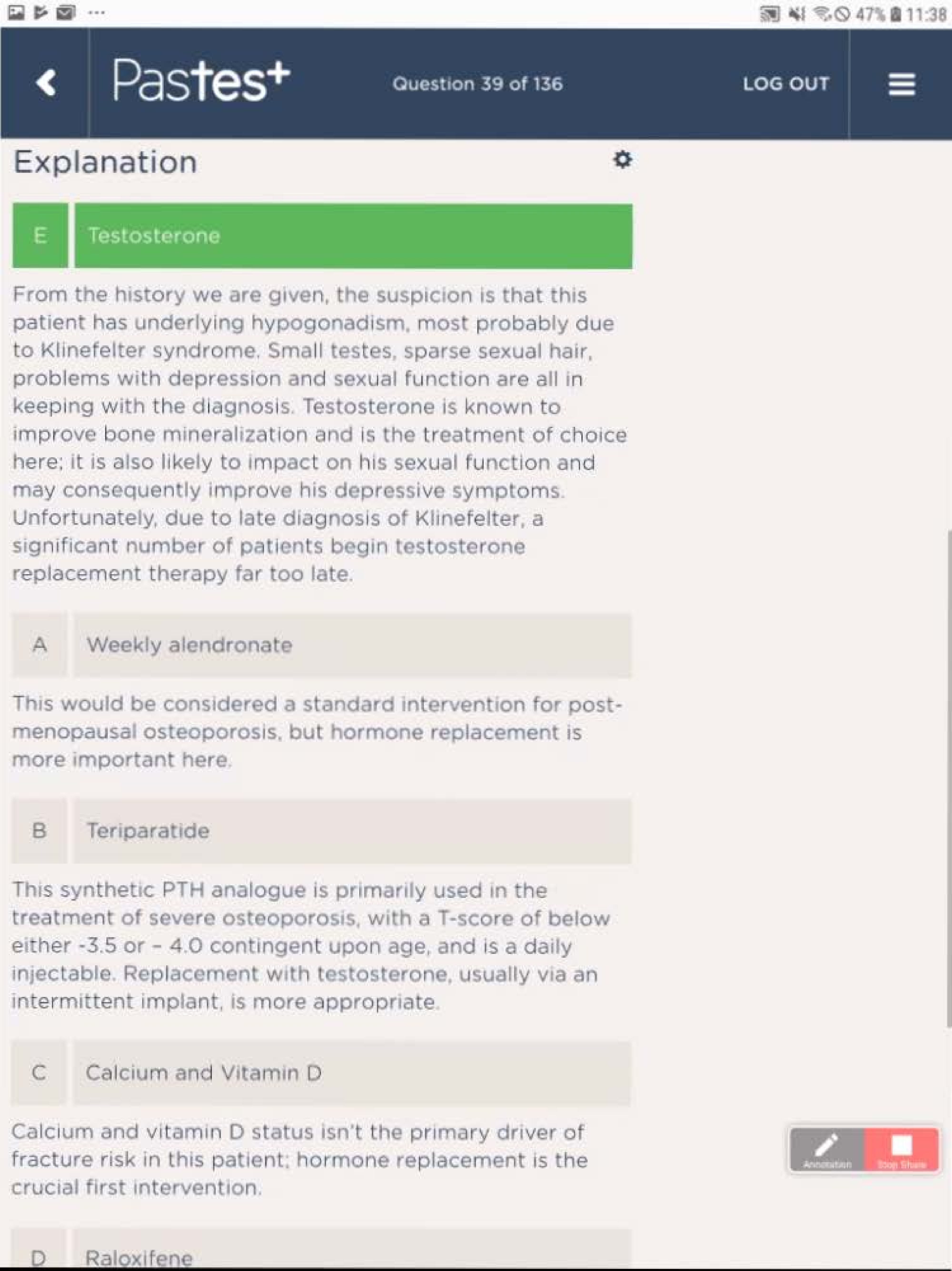
Investigations:

Hb	12.6 g/dl
WCC	7.1 x10^9/l
PLT	197 x10^9/l
Na^+	139 mmol/l
K^+	4.7 mmol/l
Creatinine	124 µmol/l
Ca^{++}	2.2 mmol/l
T-score	-3.1

Which of the following is the most appropriate way to manage him?

A	Weekly alendronate
B	Teriparatide
C	Calcium and Vitamin D
D	Raloxifene
E	Testosterone

Rana Alnasser's screen



Explanation

E	Testosterone

From the history we are given, the suspicion is that this patient has underlying hypogonadism, most probably due to Klinefelter syndrome. Small testes, sparse sexual hair, problems with depression and sexual function are all in keeping with the diagnosis. Testosterone is known to improve bone mineralization and is the treatment of choice here; it is also likely to impact on his sexual function and may consequently improve his depressive symptoms. Unfortunately, due to late diagnosis of Klinefelter, a significant number of patients begin testosterone replacement therapy far too late.

A	Weekly alendronate

This would be considered a standard intervention for post-menopausal osteoporosis, but hormone replacement is more important here.

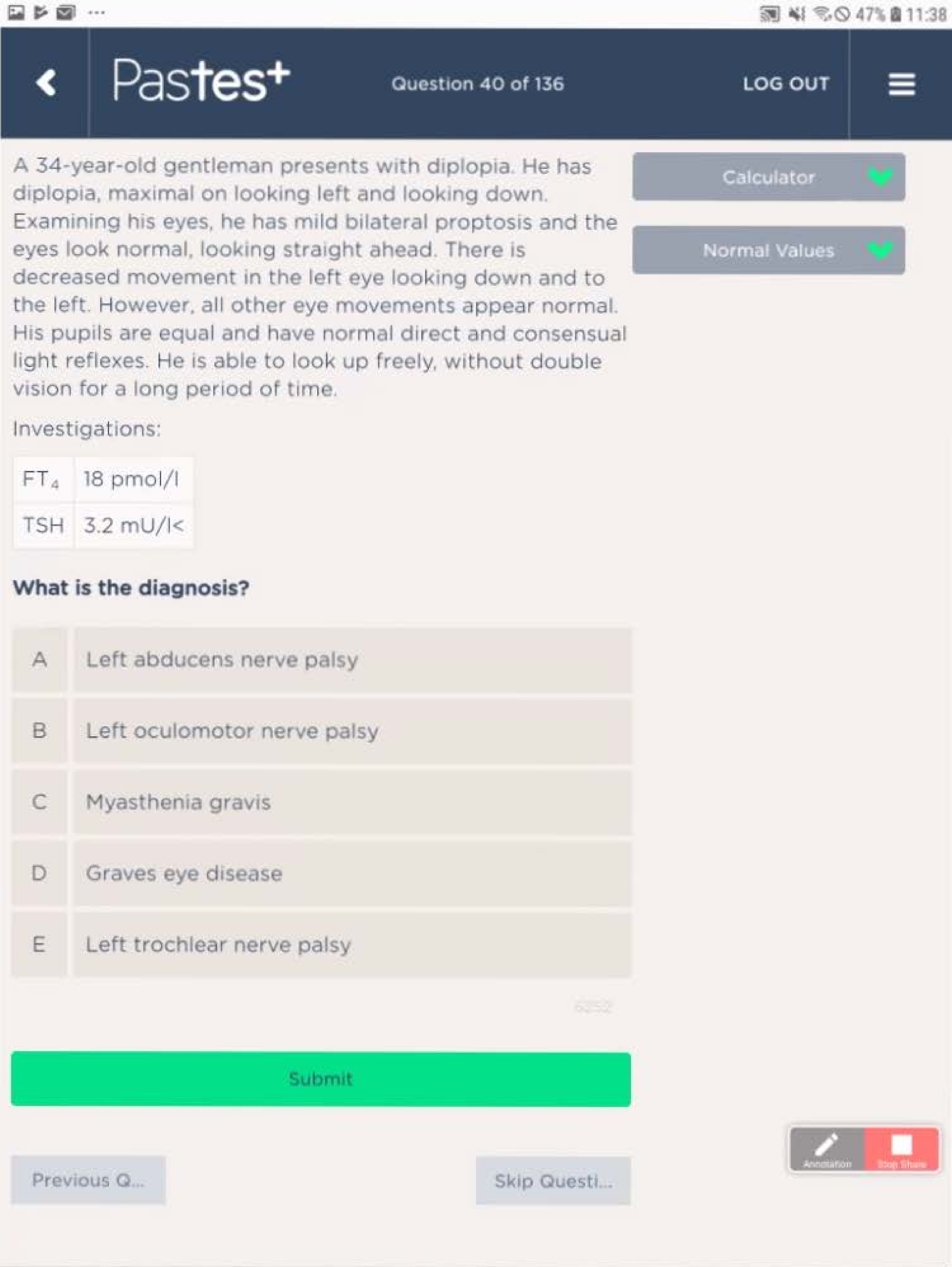
B	Teriparatide

This synthetic PTH analogue is primarily used in the treatment of severe osteoporosis, with a T-score of below either -3.5 or – 4.0 contingent upon age, and is a daily injectable. Replacement with testosterone, usually via an intermittent implant, is more appropriate.

C	Calcium and Vitamin D

Calcium and vitamin D status isn't the primary driver of fracture risk in this patient; hormone replacement is the crucial first intervention.

D	Raloxifene



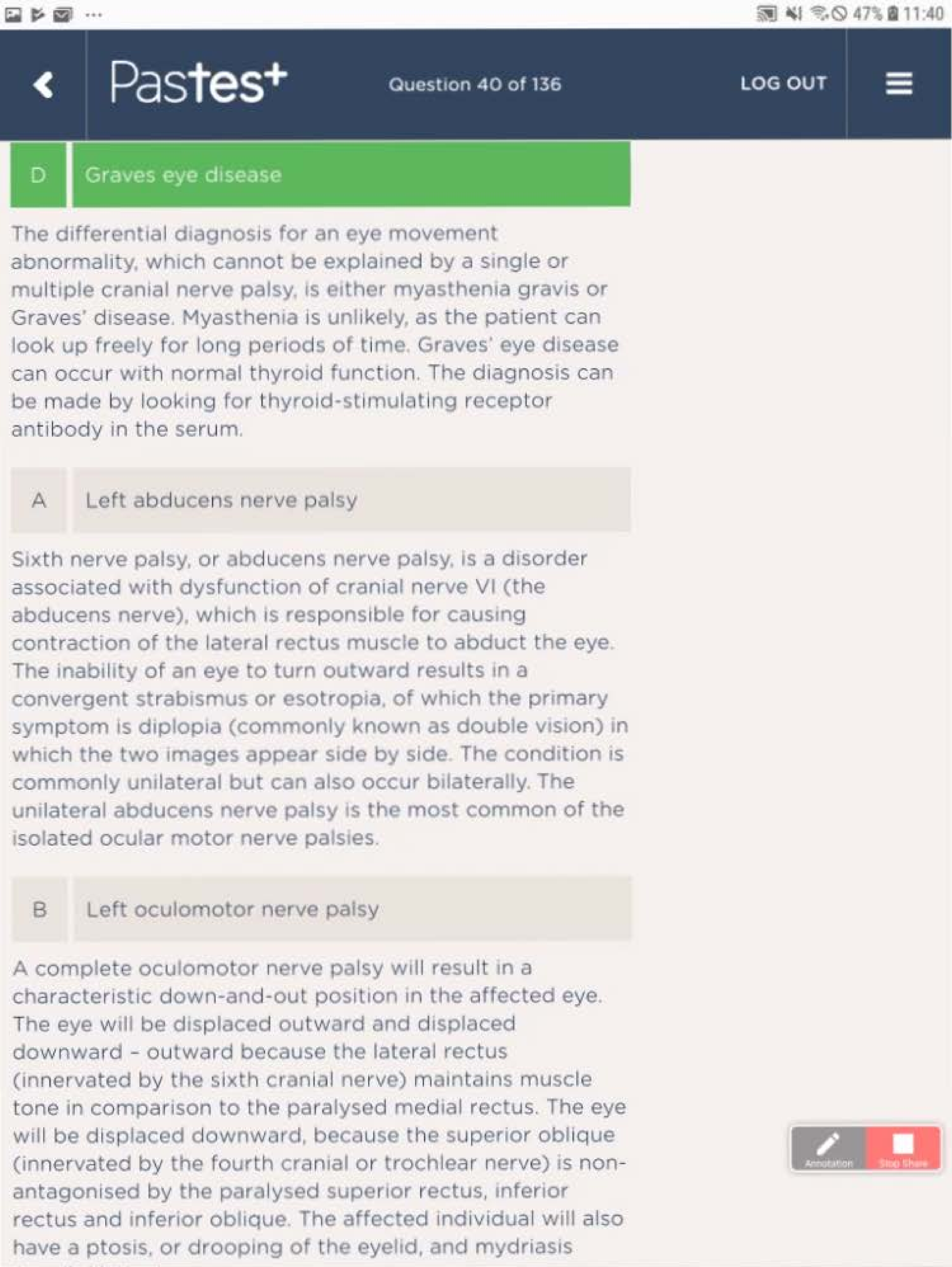
A 34-year-old gentleman presents with diplopia. He has diplopia, maximal on looking left and looking down. Examining his eyes, he has mild bilateral proptosis and the eyes look normal, looking straight ahead. There is decreased movement in the left eye looking down and to the left. However, all other eye movements appear normal. His pupils are equal and have normal direct and consensual light reflexes. He is able to look up freely, without double vision for a long period of time.

Investigations:

FT_4	18 pmol/l
TSH	3.2 mU/l<

What is the diagnosis?

A	Left abducens nerve palsy
B	Left oculomotor nerve palsy
C	Myasthenia gravis
D	Graves eye disease
E	Left trochlear nerve palsy



D Graves eye disease

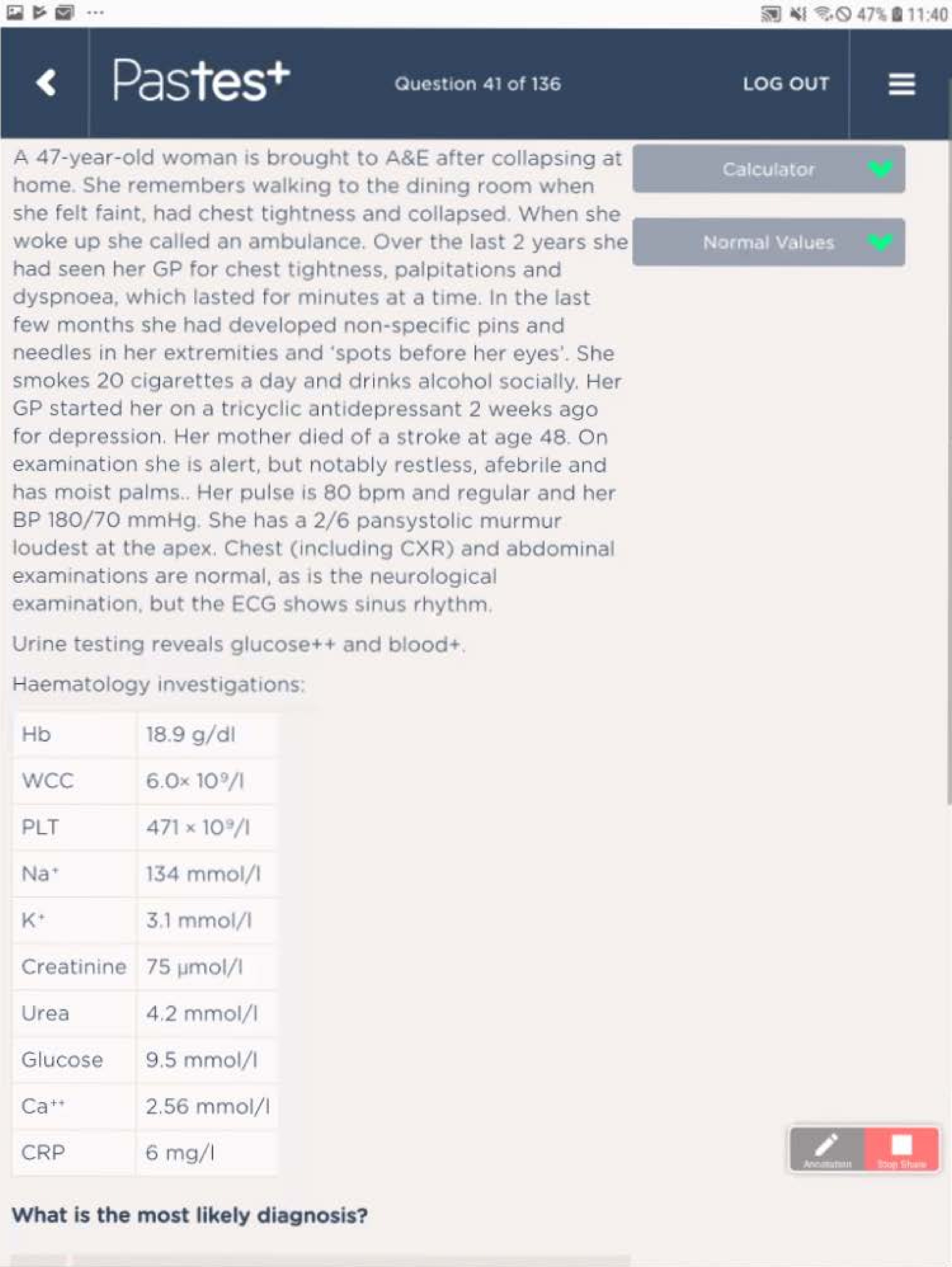
The differential diagnosis for an eye movement abnormality, which cannot be explained by a single or multiple cranial nerve palsy, is either myasthenia gravis or Graves' disease. Myasthenia is unlikely, as the patient can look up freely for long periods of time. Graves' eye disease can occur with normal thyroid function. The diagnosis can be made by looking for thyroid-stimulating receptor antibody in the serum.

A Left abducens nerve palsy

Sixth nerve palsy, or abducens nerve palsy, is a disorder associated with dysfunction of cranial nerve VI (the abducens nerve), which is responsible for causing contraction of the lateral rectus muscle to abduct the eye. The inability of an eye to turn outward results in a convergent strabismus or esotropia, of which the primary symptom is diplopia (commonly known as double vision) in which the two images appear side by side. The condition is commonly unilateral but can also occur bilaterally. The unilateral abducens nerve palsy is the most common of the isolated ocular motor nerve palsies.

B Left oculomotor nerve palsy

A complete oculomotor nerve palsy will result in a characteristic down-and-out position in the affected eye. The eye will be displaced outward and displaced downward – outward because the lateral rectus (innervated by the sixth cranial nerve) maintains muscle tone in comparison to the paralysed medial rectus. The eye will be displaced downward, because the superior oblique (innervated by the fourth cranial or trochlear nerve) is non-antagonised by the paralysed superior rectus, inferior rectus and inferior oblique. The affected individual will also have a ptosis, or drooping of the eyelid, and mydriasis



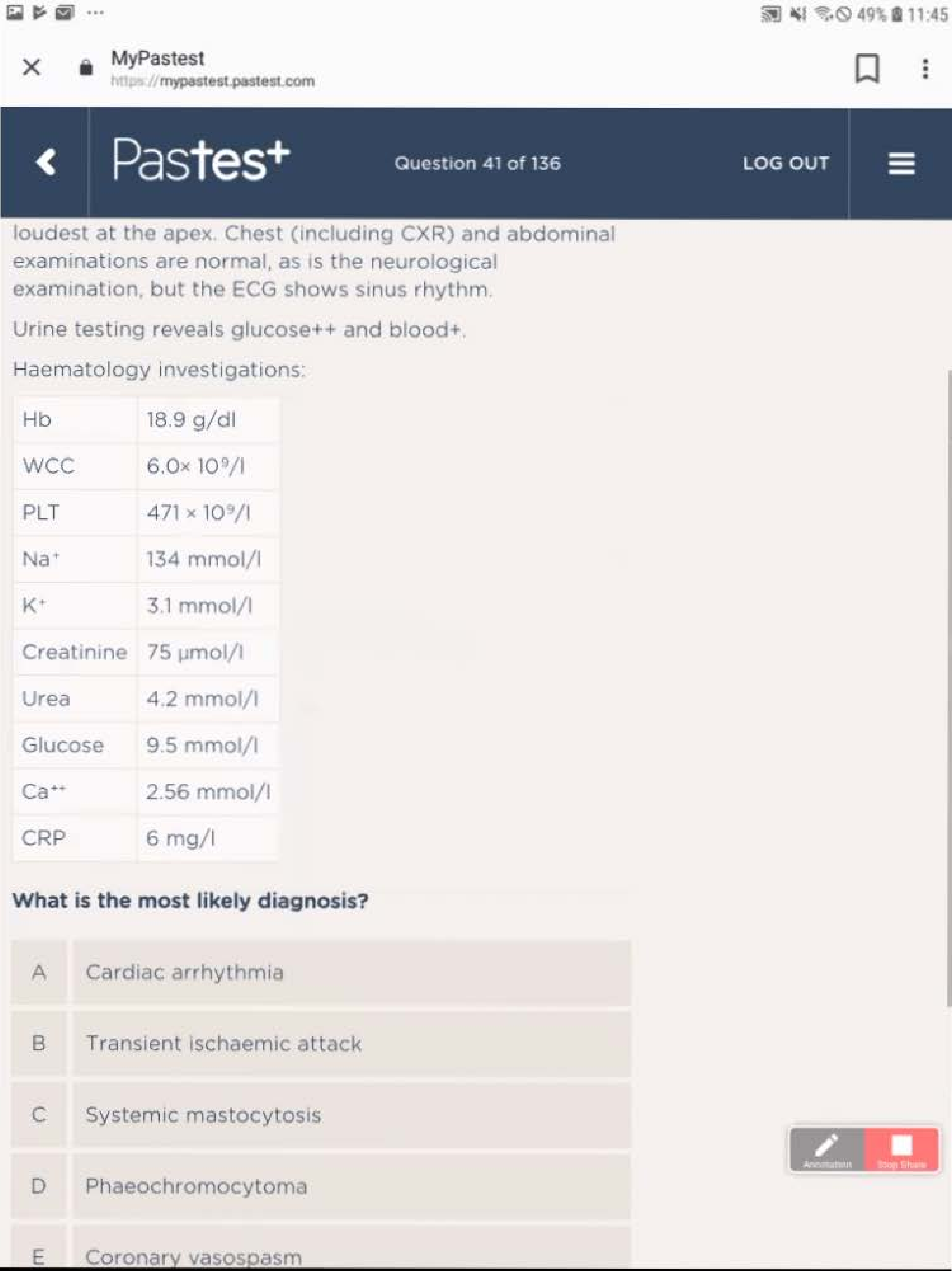
A 47-year-old woman is brought to A&E after collapsing at home. She remembers walking to the dining room when she felt faint, had chest tightness and collapsed. When she woke up she called an ambulance. Over the last 2 years she had seen her GP for chest tightness, palpitations and dyspnoea, which lasted for minutes at a time. In the last few months she had developed non-specific pins and needles in her extremities and 'spots before her eyes'. She smokes 20 cigarettes a day and drinks alcohol socially. Her GP started her on a tricyclic antidepressant 2 weeks ago for depression. Her mother died of a stroke at age 48. On examination she is alert, but notably restless, afebrile and has moist palms.. Her pulse is 80 bpm and regular and her BP 180/70 mmHg. She has a 2/6 pansystolic murmur loudest at the apex. Chest (including CXR) and abdominal examinations are normal, as is the neurological examination, but the ECG shows sinus rhythm.

Urine testing reveals glucose++ and blood+.

Haematology investigations:

Hb	18.9 g/dl
WCC	6.0× 10^9/l
PLT	471 × 10^9/l
Na$^+$	134 mmol/l
K$^+$	3.1 mmol/l
Creatinine	75 µmol/l
Urea	4.2 mmol/l
Glucose	9.5 mmol/l
Ca^{++}	2.56 mmol/l
CRP	6 mg/l

What is the most likely diagnosis?



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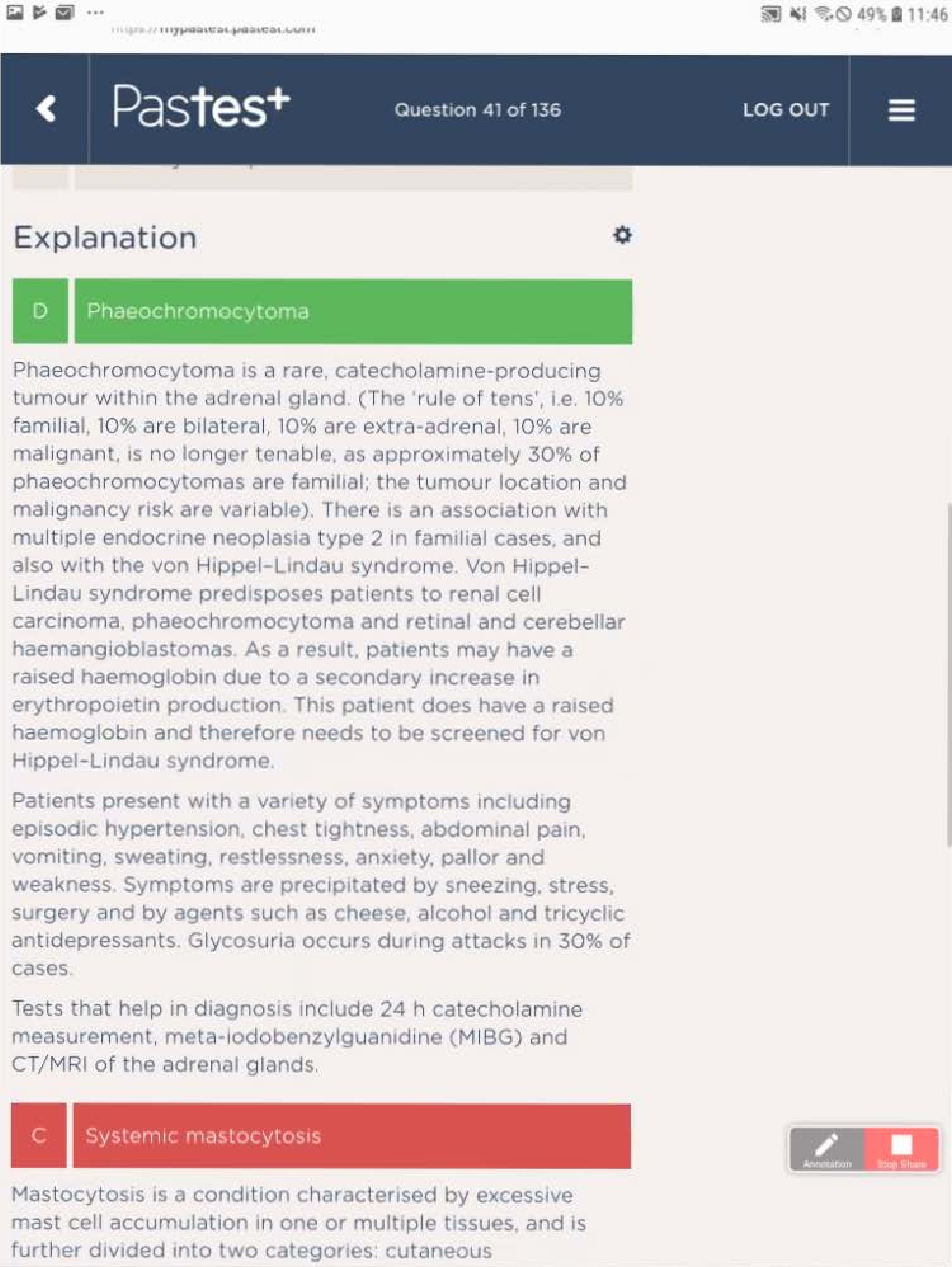
What is the most likely diagnosis?

A	Cardiac arrhythmia
B	Transient ischaemic attack
C	Systemic mastocytosis
D	Phaeochromocytoma
E	Coronary vasospasm

Rana Alnasser's screen



Explanation

D Phaeochromocytoma

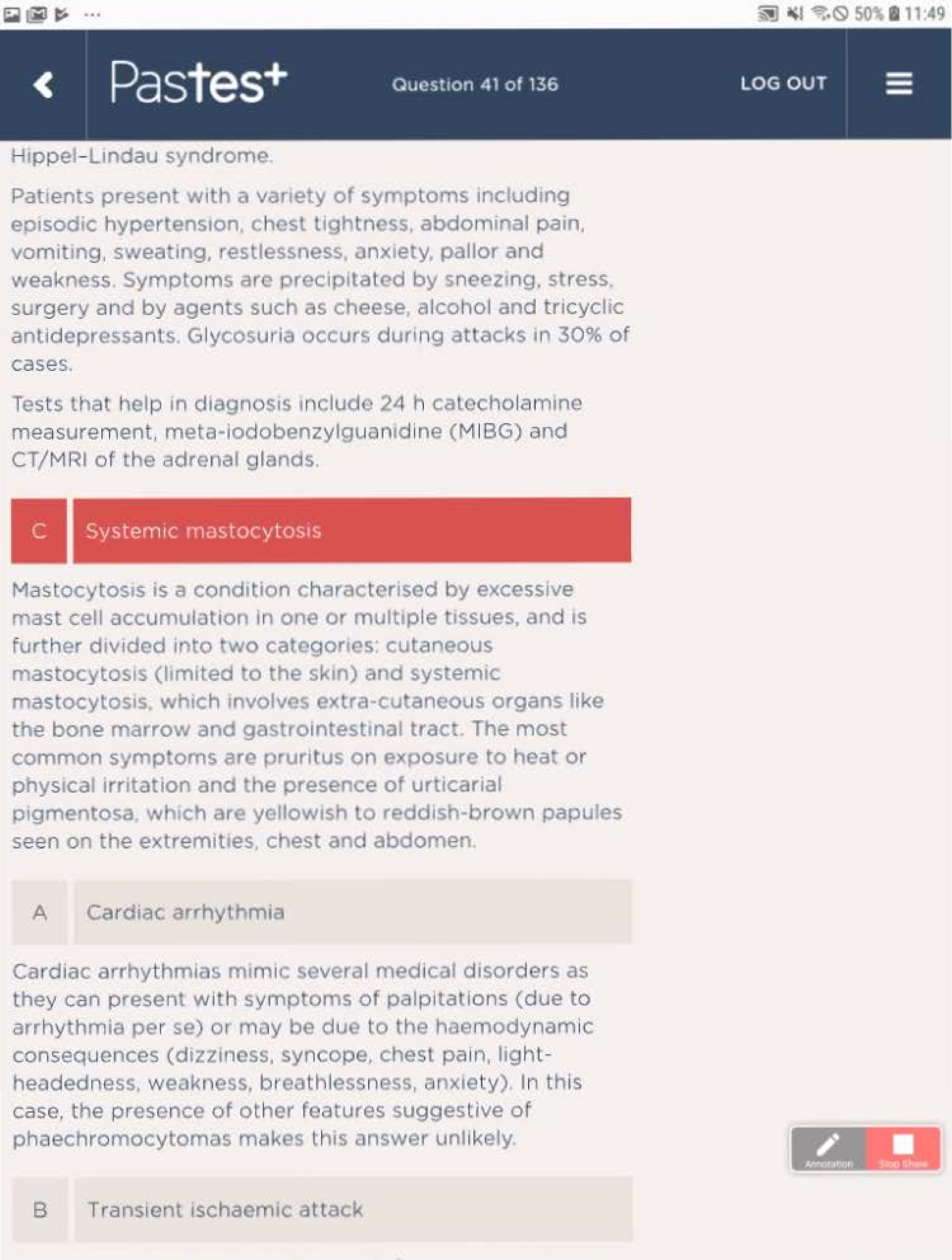
Phaeochromocytoma is a rare, catecholamine-producing tumour within the adrenal gland. (The 'rule of tens', i.e. 10% familial, 10% are bilateral, 10% are extra-adrenal, 10% are malignant, is no longer tenable, as approximately 30% of phaeochromocytomas are familial; the tumour location and malignancy risk are variable). There is an association with multiple endocrine neoplasia type 2 in familial cases, and also with the von Hippel–Lindau syndrome. Von Hippel–Lindau syndrome predisposes patients to renal cell carcinoma, phaeochromocytoma and retinal and cerebellar haemangioblastomas. As a result, patients may have a raised haemoglobin due to a secondary increase in erythropoietin production. This patient does have a raised haemoglobin and therefore needs to be screened for von Hippel–Lindau syndrome.

Patients present with a variety of symptoms including episodic hypertension, chest tightness, abdominal pain, vomiting, sweating, restlessness, anxiety, pallor and weakness. Symptoms are precipitated by sneezing, stress, surgery and by agents such as cheese, alcohol and tricyclic antidepressants. Glycosuria occurs during attacks in 30% of cases.

Tests that help in diagnosis include 24 h catecholamine measurement, meta-iodobenzylguanidine (MIBG) and CT/MRI of the adrenal glands.

C Systemic mastocytosis

Mastocytosis is a condition characterised by excessive mast cell accumulation in one or multiple tissues, and is further divided into two categories: cutaneous



Hippel–Lindau syndrome.

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C Systemic mastocytosis

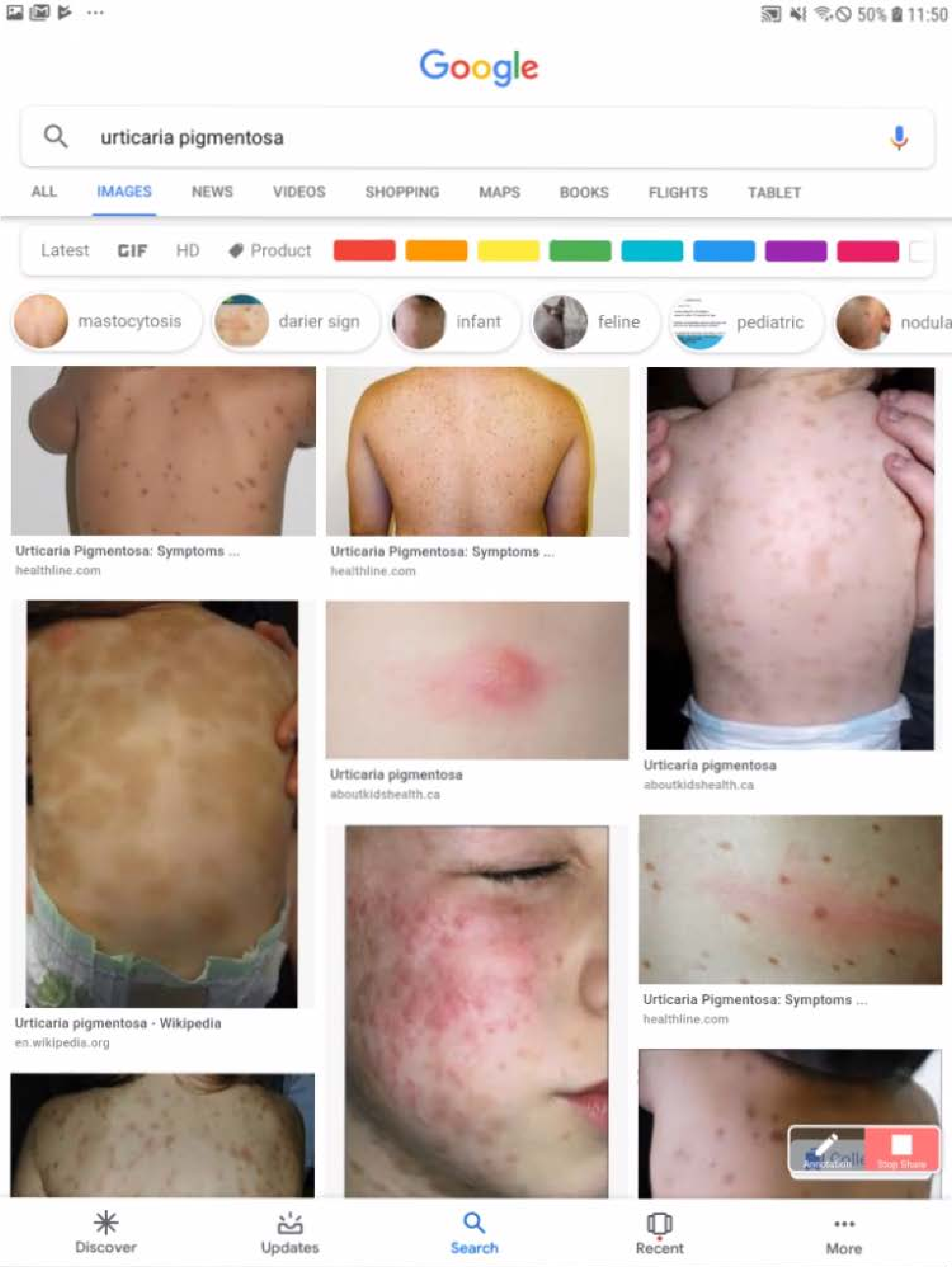
Mastocytosis is a condition characterised by excessive mast cell accumulation in one or multiple tissues, and is further divided into two categories: cutaneous mastocytosis (limited to the skin) and systemic mastocytosis, which involves extra-cutaneous organs like the bone marrow and gastrointestinal tract. The most common symptoms are pruritus on exposure to heat or physical irritation and the presence of urticarial pigmentosa, which are yellowish to reddish-brown papules seen on the extremities, chest and abdomen.

A Cardiac arrhythmia

Cardiac arrhythmias mimic several medical disorders as they can present with symptoms of palpitations (due to arrhythmia per se) or may be due to the haemodynamic consequences (dizziness, syncope, chest pain, light-headedness, weakness, breathlessness, anxiety). In this case, the presence of other features suggestive of phaechromocytomas makes this answer unlikely.

B Transient ischaemic attack

Transient ischemic attack (TIA) is defined as a transient



urticaria pigmentosa

Urticaria Pigmentosa: Symptoms ...
healthline.com

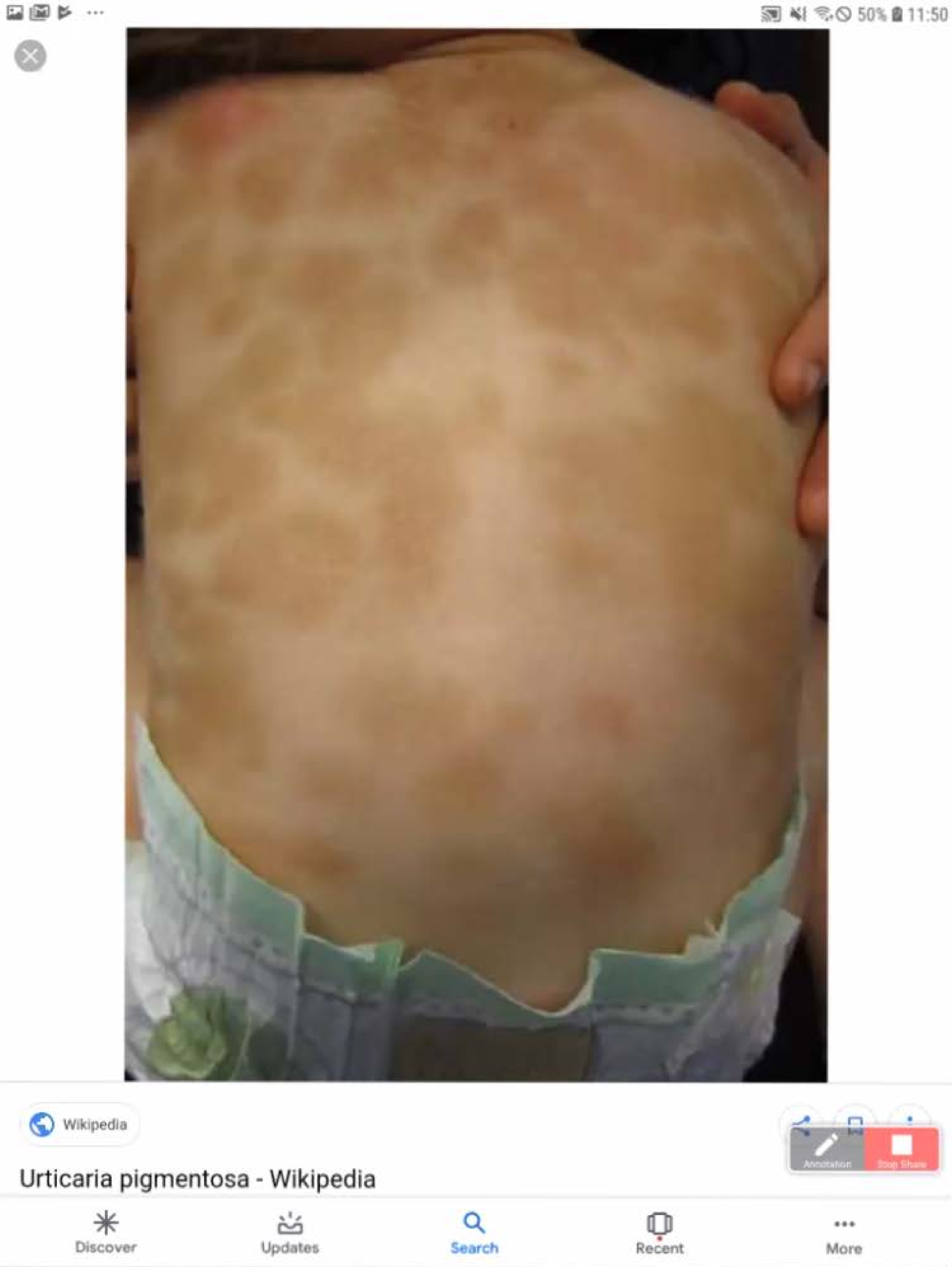
Urticaria Pigmentosa: Symptoms ...
healthline.com

Urticaria pigmentosa
aboutkidshealth.ca

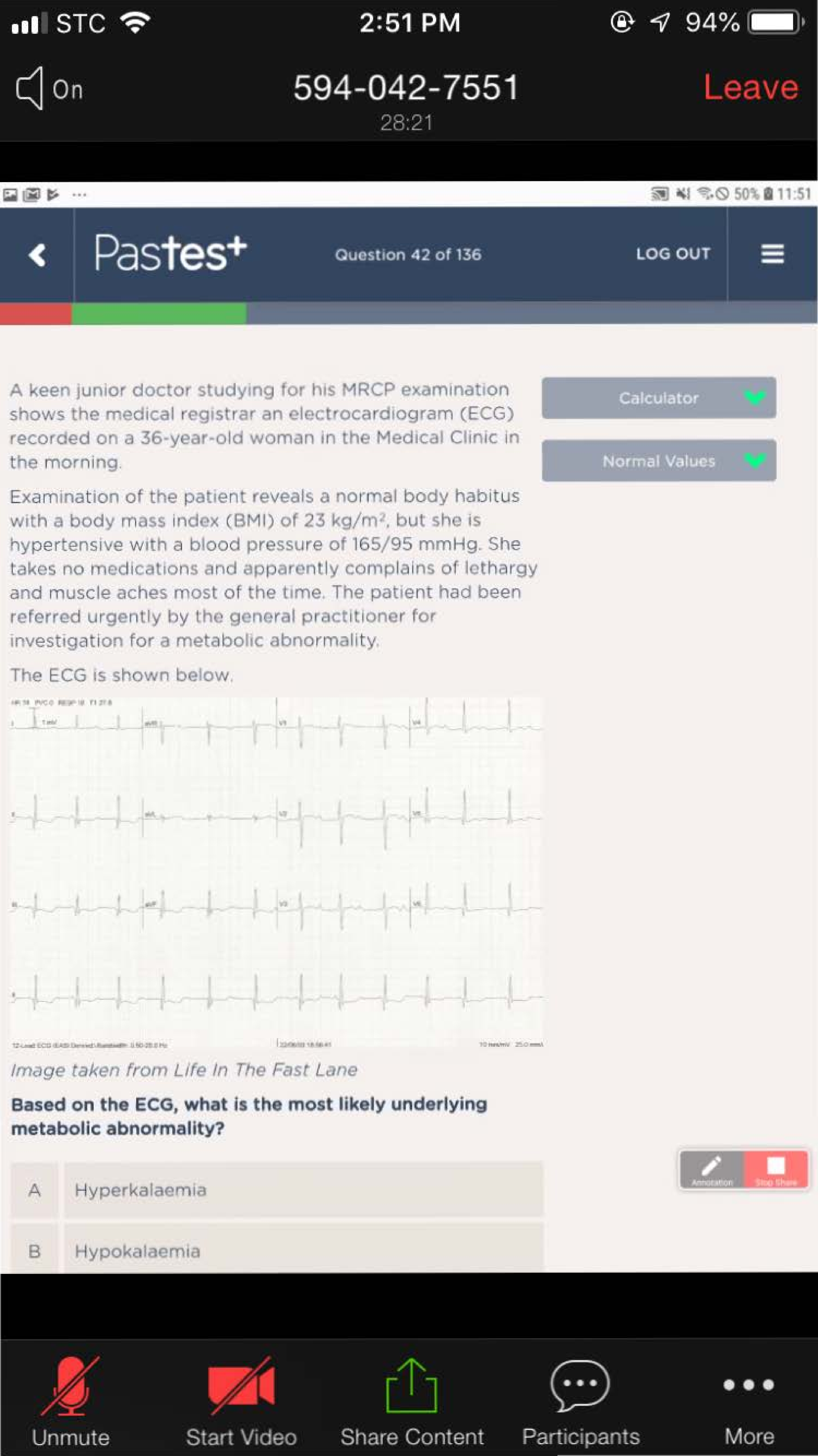
Urticaria pigmentosa - Wikipedia
en.wikipedia.org

Urticaria pigmentosa
aboutkidshealth.ca

Urticaria Pigmentosa: Symptoms ...
healthline.com



Urticaria pigmentosa - Wikipedia



A keen junior doctor studying for his MRCP examination shows the medical registrar an electrocardiogram (ECG) recorded on a 36-year-old woman in the Medical Clinic in the morning.

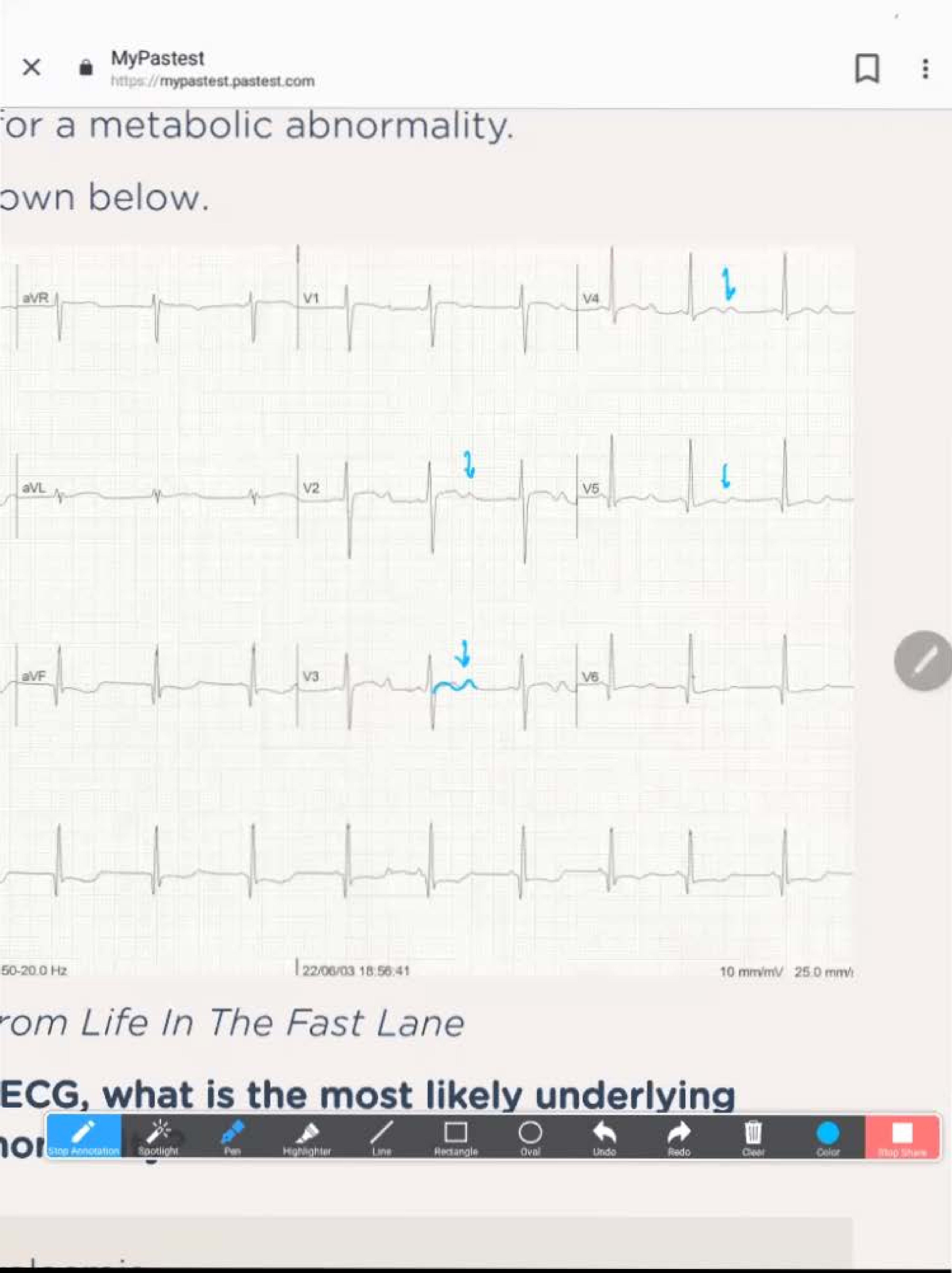
Examination of the patient reveals a normal body habitus with a body mass index (BMI) of 23 kg/m², but she is hypertensive with a blood pressure of 165/95 mmHg. She takes no medications and apparently complains of lethargy and muscle aches most of the time. The patient had been referred urgently by the general practitioner for investigation for a metabolic abnormality.

The ECG is shown below.

Image taken from Life In The Fast Lane

Based on the ECG, what is the most likely underlying metabolic abnormality?

A	Hyperkalaemia
B	Hypokalaemia



or a metabolic abnormality.

own below.

rom Life In The Fast Lane

ECG, what is the most likely underlying
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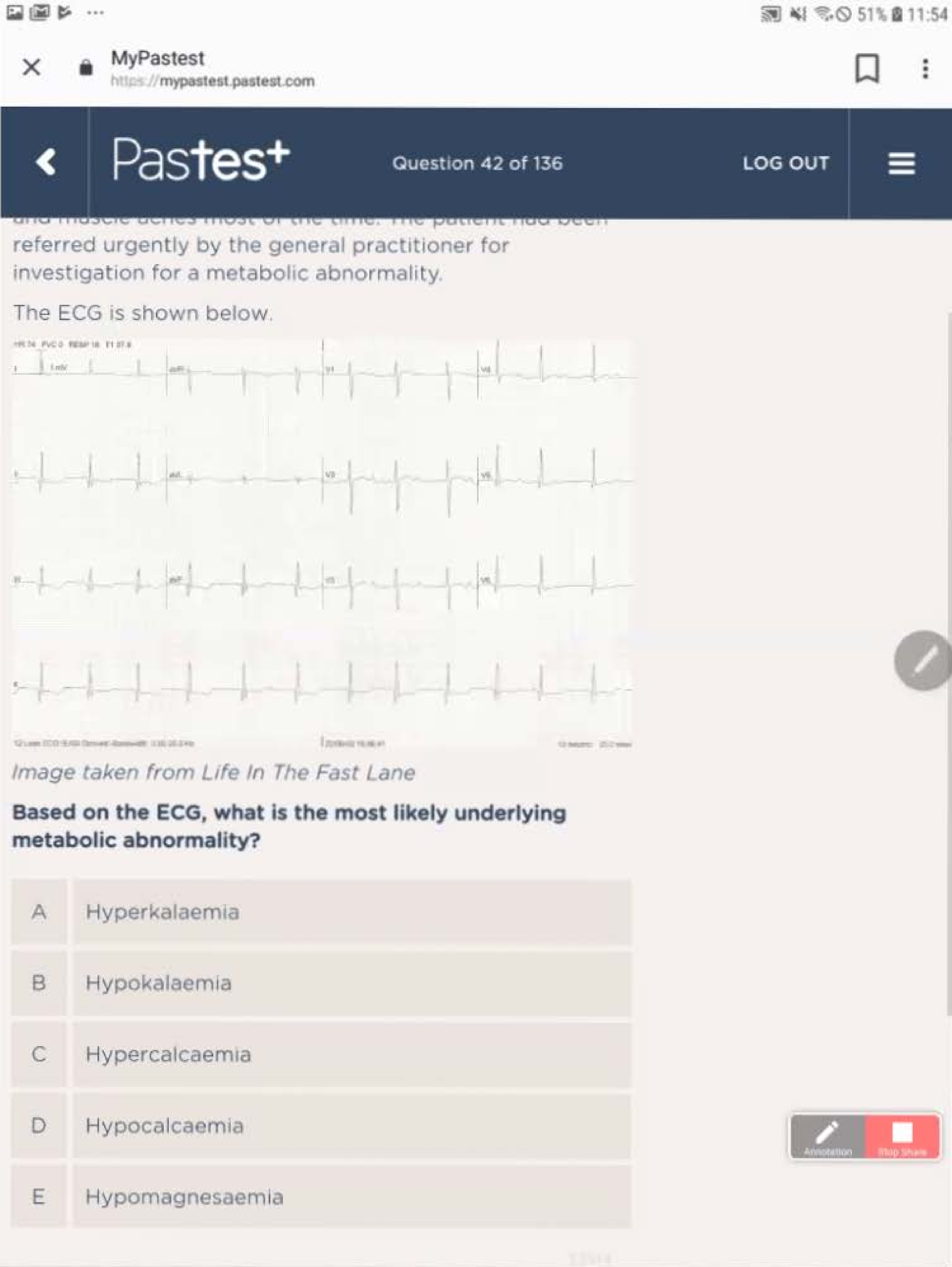


referred urgently by the general practitioner for investigation for a metabolic abnormality.

The ECG is shown below.

Image taken from Life In The Fast Lane

Based on the ECG, what is the most likely underlying metabolic abnormality?

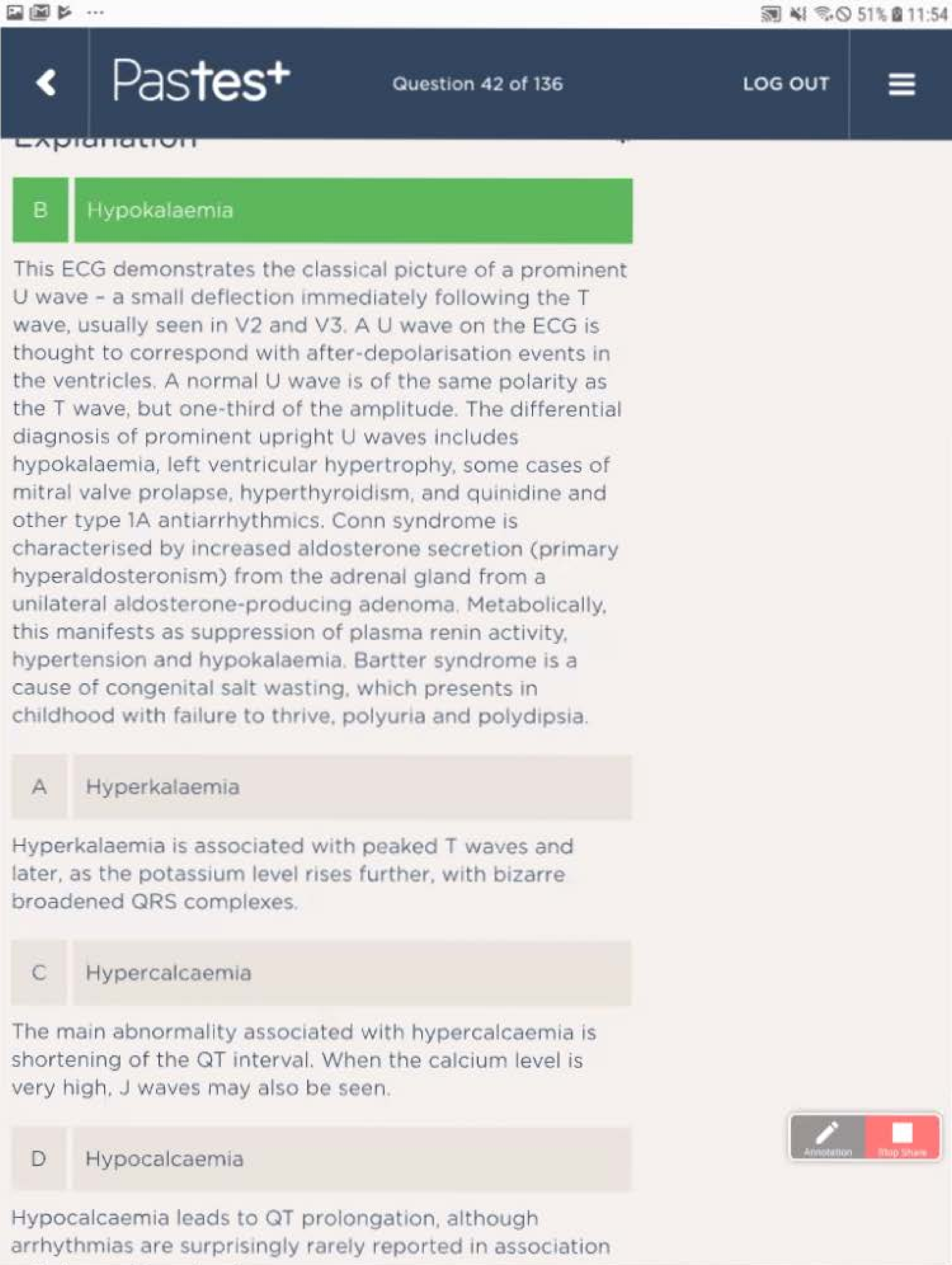
A Hyperkalaemia

B Hypokalaemia

C Hypercalcaemia

D Hypocalcaemia

E Hypomagnesaemia



B	Hypokalaemia

This ECG demonstrates the classical picture of a prominent U wave - a small deflection immediately following the T wave, usually seen in V2 and V3. A U wave on the ECG is thought to correspond with after-depolarisation events in the ventricles. A normal U wave is of the same polarity as the T wave, but one-third of the amplitude. The differential diagnosis of prominent upright U waves includes hypokalaemia, left ventricular hypertrophy, some cases of mitral valve prolapse, hyperthyroidism, and quinidine and other type 1A antiarrhythmics. Conn syndrome is characterised by increased aldosterone secretion (primary hyperaldosteronism) from the adrenal gland from a unilateral aldosterone-producing adenoma. Metabolically, this manifests as suppression of plasma renin activity, hypertension and hypokalaemia. Bartter syndrome is a cause of congenital salt wasting, which presents in childhood with failure to thrive, polyuria and polydipsia.

A	Hyperkalaemia

Hyperkalaemia is associated with peaked T waves and later, as the potassium level rises further, with bizarre broadened QRS complexes.

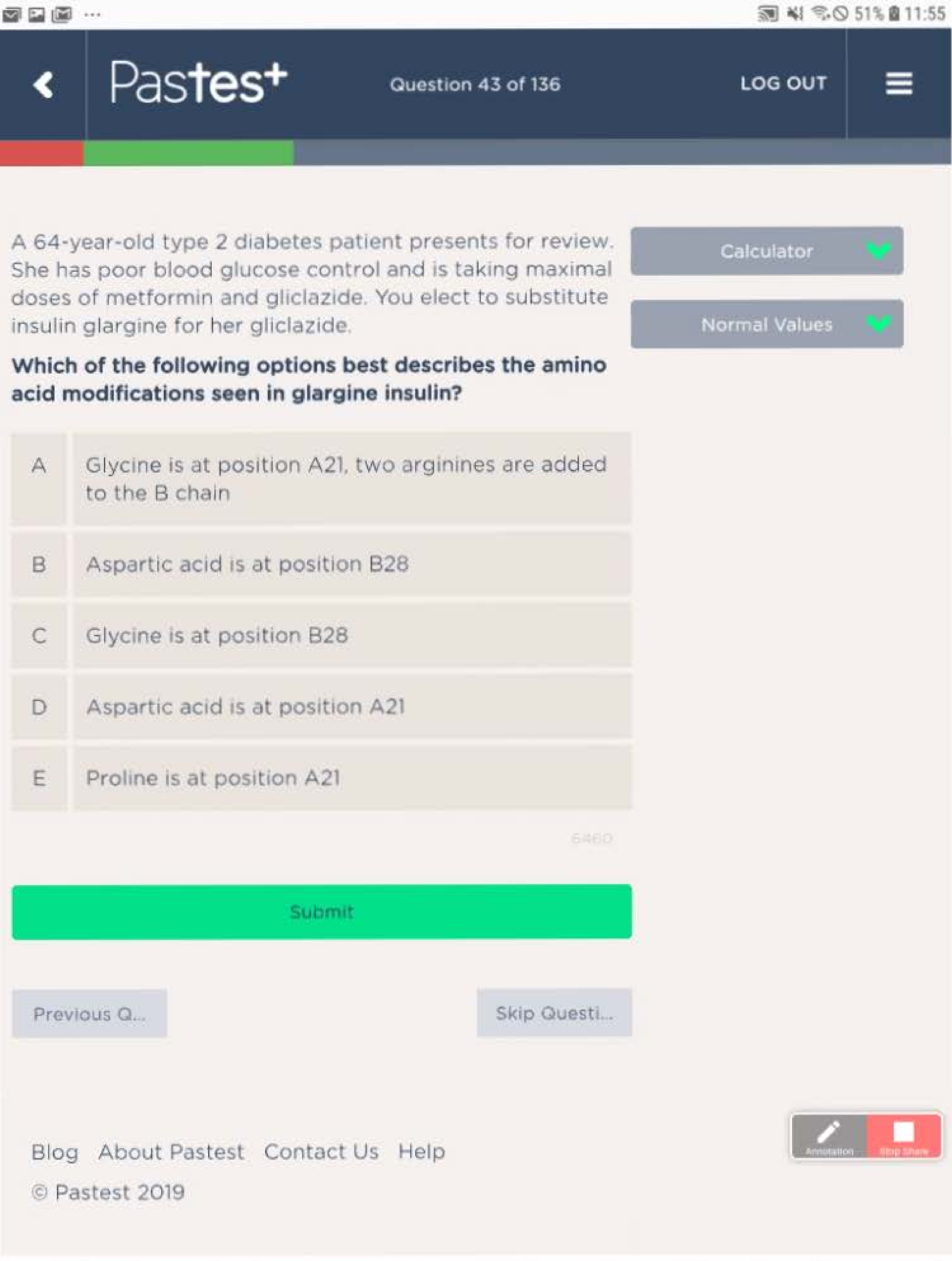
C	Hypercalcaemia

The main abnormality associated with hypercalcaemia is shortening of the QT interval. When the calcium level is very high, J waves may also be seen.

D	Hypocalcaemia

Hypocalcaemia leads to QT prolongation, although arrhythmias are surprisingly rarely reported in association

Rana Alnasser's screen



A 64-year-old type 2 diabetes patient presents for review. She has poor blood glucose control and is taking maximal doses of metformin and gliclazide. You elect to substitute insulin glargine for her gliclazide.

Which of the following options best describes the amino acid modifications seen in glargine insulin?

A	Glycine is at position A21, two arginines are added to the B chain
B	Aspartic acid is at position B28
C	Glycine is at position B28
D	Aspartic acid is at position A21
E	Proline is at position A21

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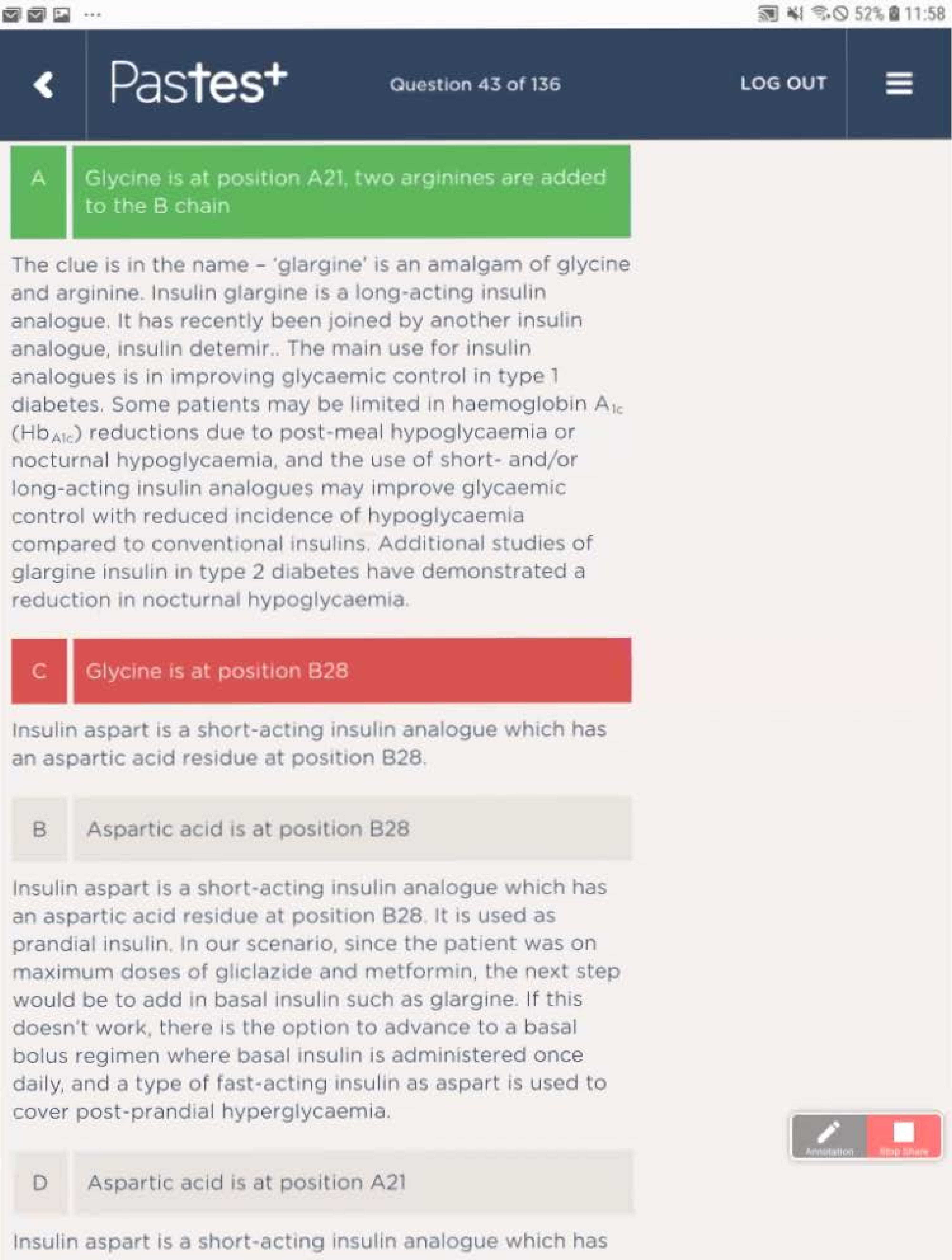
Rana Alnasser's screen



A Glycine is at position A21, two arginines are added to the B chain

The clue is in the name – 'glargine' is an amalgam of glycine and arginine. Insulin glargine is a long-acting insulin analogue. It has recently been joined by another insulin analogue, insulin detemir.. The main use for insulin analogues is in improving glycaemic control in type 1 diabetes. Some patients may be limited in haemoglobin A_{1c} (Hb_{A1c}) reductions due to post-meal hypoglycaemia or nocturnal hypoglycaemia, and the use of short- and/or long-acting insulin analogues may improve glycaemic control with reduced incidence of hypoglycaemia compared to conventional insulins. Additional studies of glargine insulin in type 2 diabetes have demonstrated a reduction in nocturnal hypoglycaemia.

C Glycine is at position B28

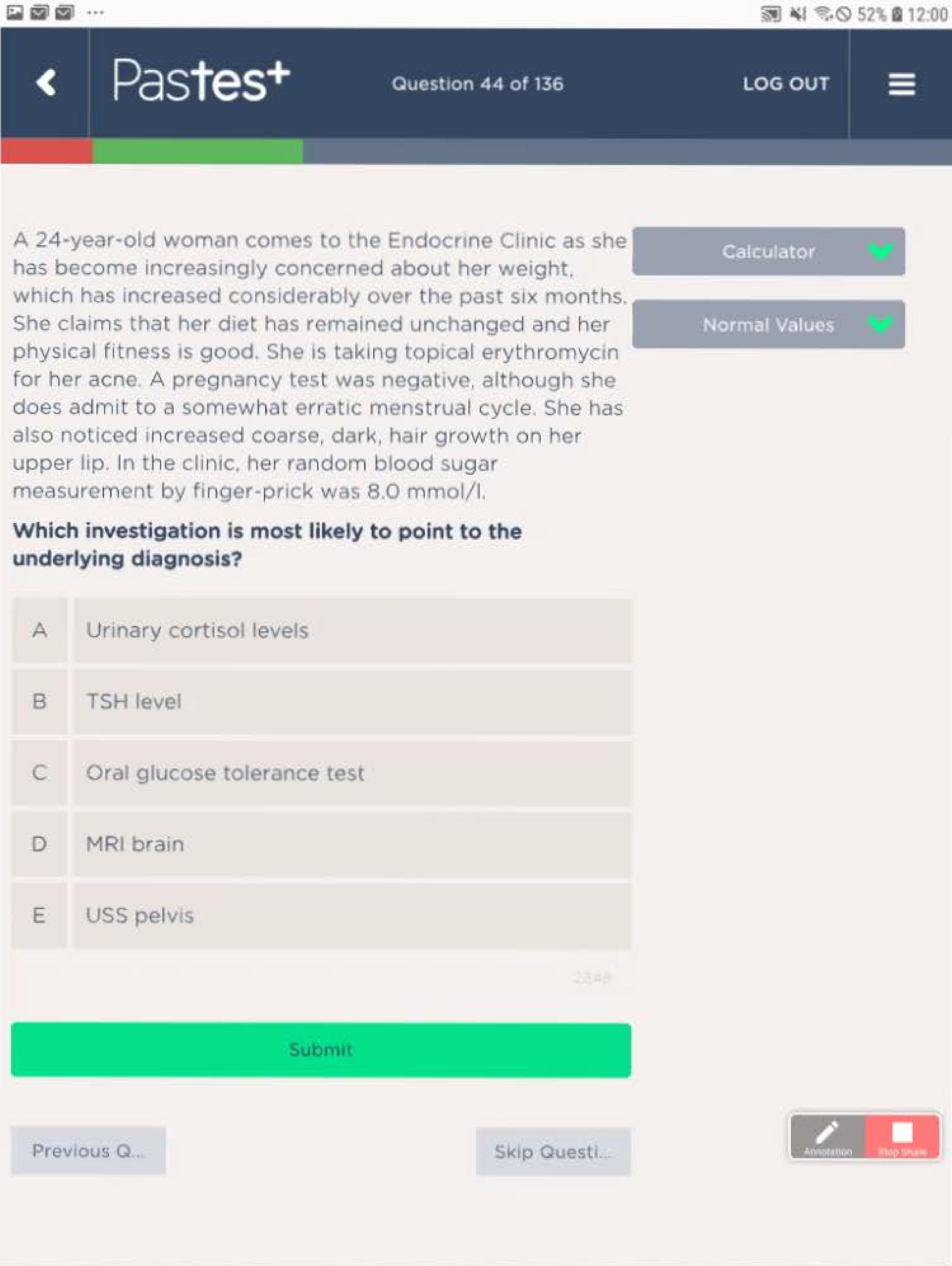
Insulin aspart is a short-acting insulin analogue which has an aspartic acid residue at position B28.

B Aspartic acid is at position B28

Insulin aspart is a short-acting insulin analogue which has an aspartic acid residue at position B28. It is used as prandial insulin. In our scenario, since the patient was on maximum doses of gliclazide and metformin, the next step would be to add in basal insulin such as glargine. If this doesn't work, there is the option to advance to a basal bolus regimen where basal insulin is administered once daily, and a type of fast-acting insulin as aspart is used to cover post-prandial hyperglycaemia.

D Aspartic acid is at position A21

Insulin aspart is a short-acting insulin analogue which has

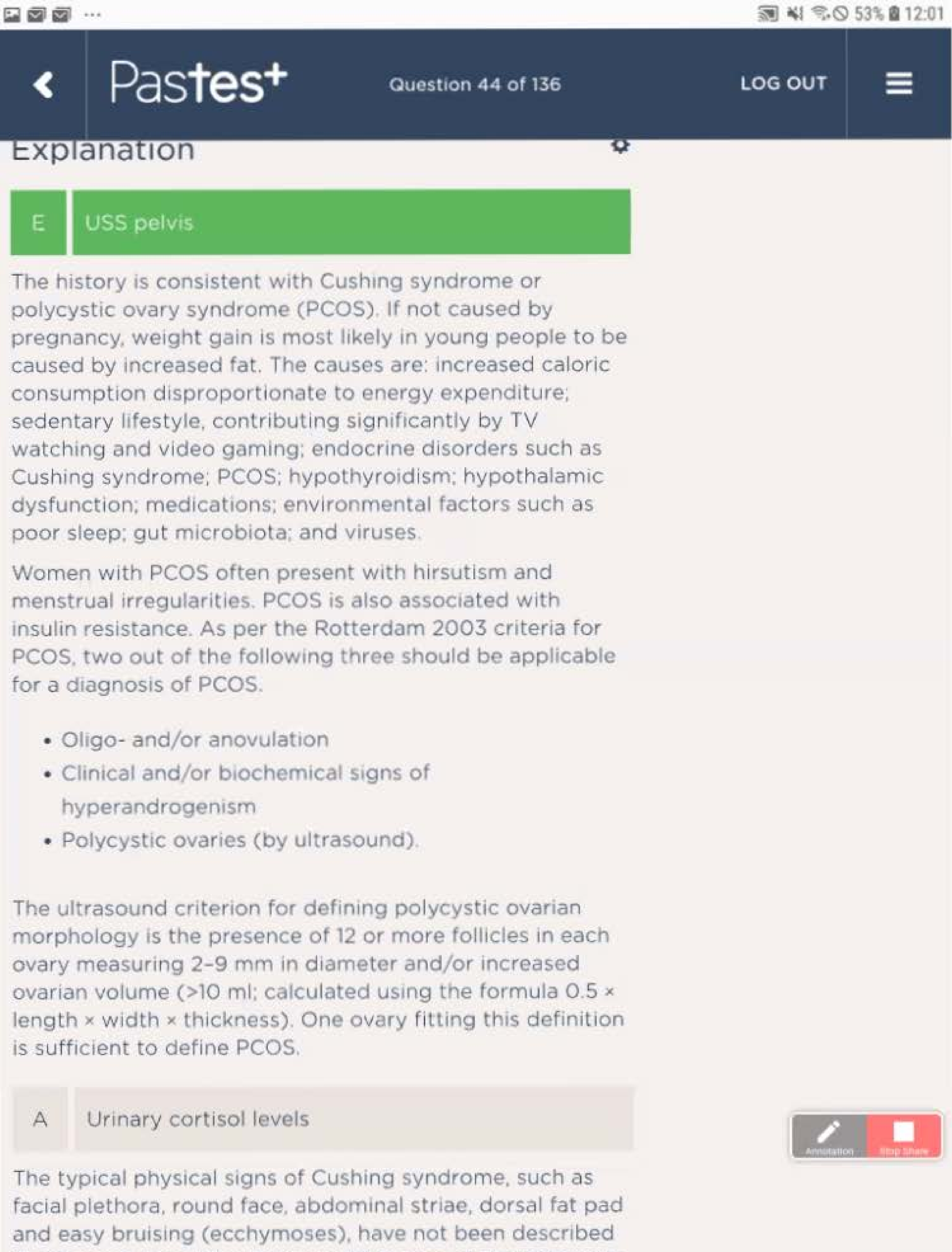


A 24-year-old woman comes to the Endocrine Clinic as she has become increasingly concerned about her weight, which has increased considerably over the past six months. She claims that her diet has remained unchanged and her physical fitness is good. She is taking topical erythromycin for her acne. A pregnancy test was negative, although she does admit to a somewhat erratic menstrual cycle. She has also noticed increased coarse, dark, hair growth on her upper lip. In the clinic, her random blood sugar measurement by finger-prick was 8.0 mmol/l.

Which investigation is most likely to point to the underlying diagnosis?

A Urinary cortisol levels
B TSH level
C Oral glucose tolerance test
D MRI brain
E USS pelvis

Rana Alnasser's screen



Explanation

E USS pelvis

The history is consistent with Cushing syndrome or polycystic ovary syndrome (PCOS). If not caused by pregnancy, weight gain is most likely in young people to be caused by increased fat. The causes are: increased caloric consumption disproportionate to energy expenditure; sedentary lifestyle, contributing significantly by TV watching and video gaming; endocrine disorders such as Cushing syndrome; PCOS; hypothyroidism; hypothalamic dysfunction; medications; environmental factors such as poor sleep; gut microbiota; and viruses.

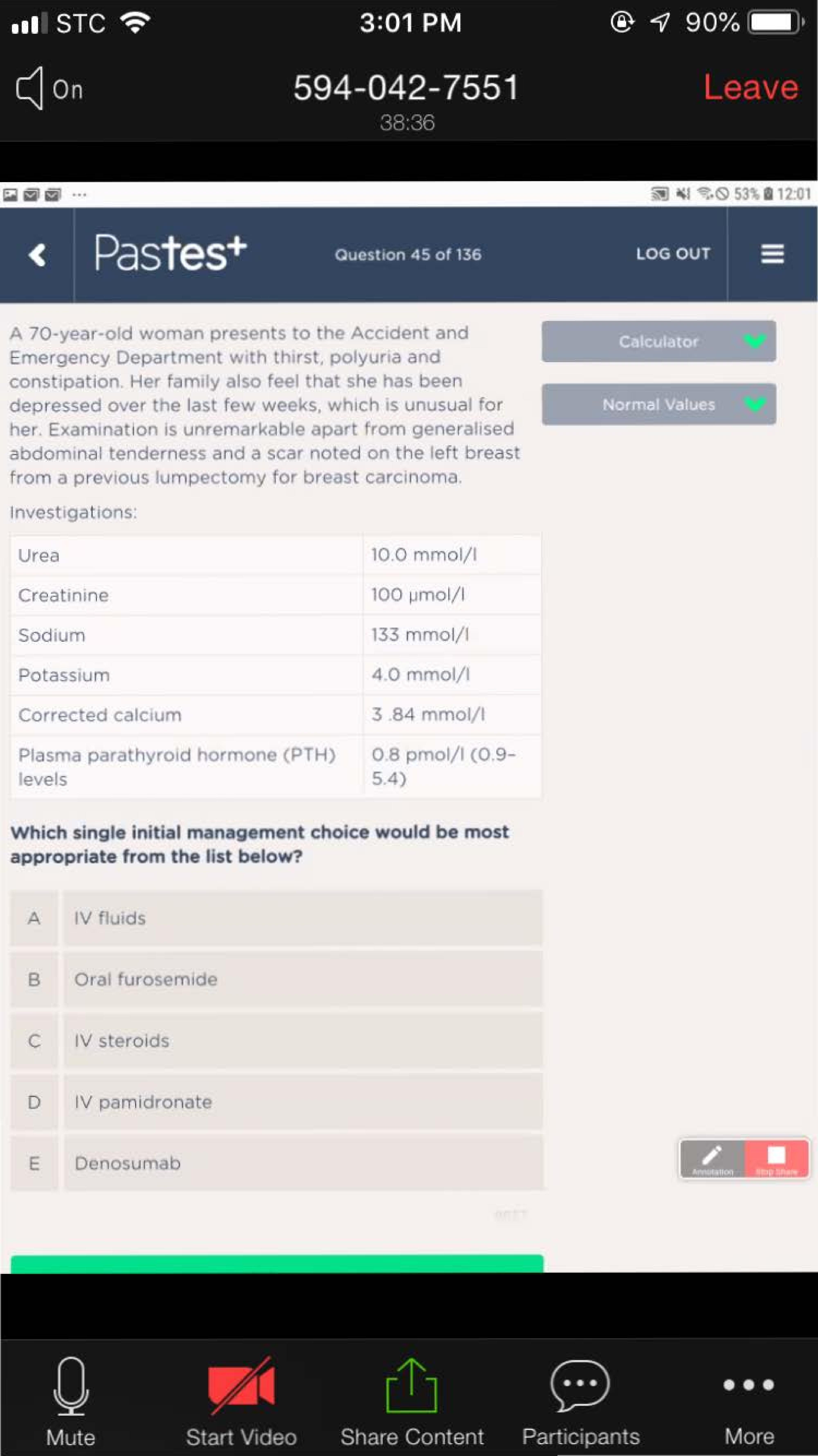
Women with PCOS often present with hirsutism and menstrual irregularities. PCOS is also associated with insulin resistance. As per the Rotterdam 2003 criteria for PCOS, two out of the following three should be applicable for a diagnosis of PCOS.

- Oligo- and/or anovulation
- Clinical and/or biochemical signs of hyperandrogenism
- Polycystic ovaries (by ultrasound).

The ultrasound criterion for defining polycystic ovarian morphology is the presence of 12 or more follicles in each ovary measuring 2–9 mm in diameter and/or increased ovarian volume (>10 ml; calculated using the formula 0.5 × length × width × thickness). One ovary fitting this definition is sufficient to define PCOS.

A Urinary cortisol levels

The typical physical signs of Cushing syndrome, such as facial plethora, round face, abdominal striae, dorsal fat pad and easy bruising (ecchymoses), have not been described in this case. Screening tests would be one of the following:



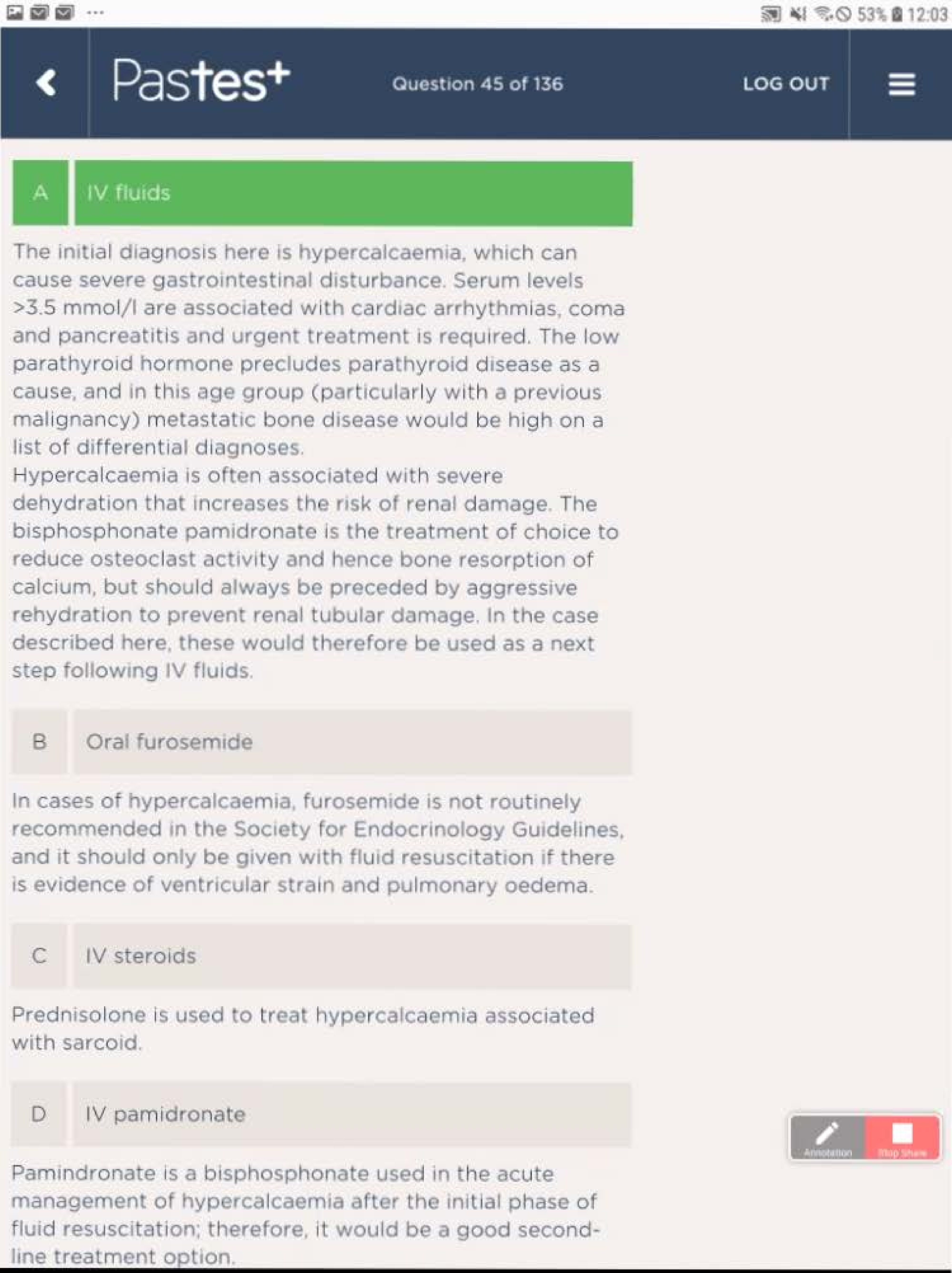
A 70-year-old woman presents to the Accident and Emergency Department with thirst, polyuria and constipation. Her family also feel that she has been depressed over the last few weeks, which is unusual for her. Examination is unremarkable apart from generalised abdominal tenderness and a scar noted on the left breast from a previous lumpectomy for breast carcinoma.

Investigations:

Urea	10.0 mmol/l
Creatinine	100 µmol/l
Sodium	133 mmol/l
Potassium	4.0 mmol/l
Corrected calcium	3 .84 mmol/l
Plasma parathyroid hormone (PTH) levels	0.8 pmol/l (0.9–5.4)

Which single initial management choice would be most appropriate from the list below?

A	IV fluids
B	Oral furosemide
C	IV steroids
D	IV pamidronate
E	Denosumab



A IV fluids

The initial diagnosis here is hypercalcaemia, which can cause severe gastrointestinal disturbance. Serum levels >3.5 mmol/l are associated with cardiac arrhythmias, coma and pancreatitis and urgent treatment is required. The low parathyroid hormone precludes parathyroid disease as a cause, and in this age group (particularly with a previous malignancy) metastatic bone disease would be high on a list of differential diagnoses.
Hypercalcaemia is often associated with severe dehydration that increases the risk of renal damage. The bisphosphonate pamidronate is the treatment of choice to reduce osteoclast activity and hence bone resorption of calcium, but should always be preceded by aggressive rehydration to prevent renal tubular damage. In the case described here, these would therefore be used as a next step following IV fluids.

B Oral furosemide

In cases of hypercalcaemia, furosemide is not routinely recommended in the Society for Endocrinology Guidelines, and it should only be given with fluid resuscitation if there is evidence of ventricular strain and pulmonary oedema.

C IV steroids

Prednisolone is used to treat hypercalcaemia associated with sarcoid.

D IV pamidronate

Pamindronate is a bisphosphonate used in the acute management of hypercalcaemia after the initial phase of fluid resuscitation; therefore, it would be a good second-line treatment option.